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SARCOMA OF THE CHOROID WITH DESTRUCTIVE HEMORRHAGE.

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(With Text-Plate X.)

IT might be expected that choroidal sarcomata, judging by the character of their vessel walls, which are not only thin but often highly degenerated, would frequently give rise to large and destructive hemorrhages. A search through the literature, however, seems to show that such hemorrhages are either extremely rare, or that the cases in which they occur are overlooked. That they can take place is demonstrated by the following cases which have come under the observation of the writer. The third case has already been reported in full,[8] but for the sake of completeness a short account is made of it here.

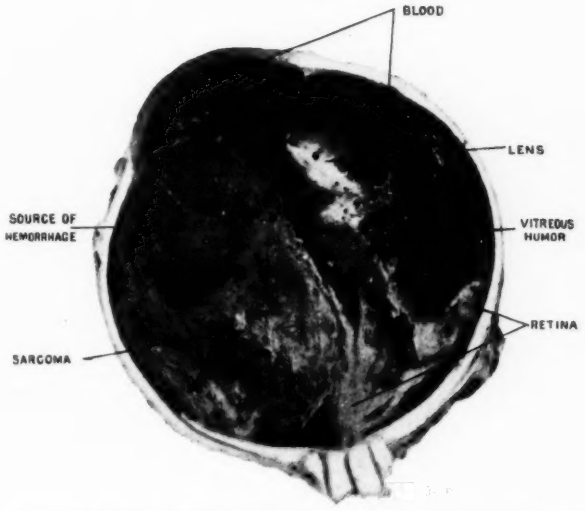
CASE I.—**Melanotic spindle-cell sarcoma of the choroid. Widespread necrosis of tumor. Destructive intraocular hemorrhage. Purulent infiltration of cornea.** (Fig. 1.)

Admitted to the Infirmary, November 7, 1903, service of Dr. E. E. Jack. Thomas C., porter, white, aged fifty-seven. About fifteen years ago patient noticed that a large dark spot would appear on the paper that he was reading. This gradually grew larger until about two years ago, when all sight was lost in the right eye except perception of light. On the day before admission, there was an attack of pain in the eye so severe as to cause nausea and to keep the patient awake during the night. On admission the cornea was steamy, the anterior chamber almost completely filled with blood, and there was slight œdema of lids and

conjunctiva. The eye was hard and giving great pain. No fundus reflex could be obtained. Pilocarpine, 1 % solution, was instilled in the eye t. i. d. but the œdema of the lids and conjunctiva greatly increased, the pain became more severe, and three days after admission the eye was enucleated.

Pathological Condition.—(Fixation in 10 % formalin.) The globe is normal in size and shape. The cornea is cloudy throughout, but shows no loss of substance. The anterior chamber, 2.5*mm* deep, is filled with blood. The root of the iris blocks the filtration angle, but the rest of the iris is not adherent to the cornea and maintains its vertical position. The lens is slightly cataractous and is dislocated backwards, downwards, and outwards, into the vitreous chamber. The nasal half of the globe is occupied by a mass 19*mm* × 12*mm* in cross-section, which reaches the margin of the optic disc and extends upwards and downwards as far as the superior and inferior poles of the eye. The posterior two-thirds of this mass is dark gray in color, showing a few dark red spots, fairly firm though friable, and has a fibrillated appearance. Anteriorly the mass passes abruptly into an oval area 6*mm* × 8*mm*, which is dark red in color. This is in turn continuous, without any distinct line of demarkation, with the mass of blood filling the anterior chamber. The retina is closly applied to the mass on the nasal side, and on the other side is separated from the choroid by a large blood extravasation which is continuous with the blood in the anterior part of the eye. There remains a space about 1*cm* in the average diameter filled with clear vitreous humor. The choroid on the temporal side appears normal. The optic disc is only slightly cupped. The nerve is somewhat translucent, and its striations are well marked, indicating œdema. The sclera has not been broken through at any point, and there are no growths on its external surface.

Microscopic Examination.—(Celloidin, hematoxylin, and eosin.) The cornea is œdematous and greatly infiltrated with pus cells throughout, though the latter are most numerous at the centre near the surface. The pus cells show some tendency to collect in focal areas. There are no distinct evidences of necrosis. The epithelium is intact, as is also Bowman's membrane except at the site of an old scar. Descemet's membrane and the endothelium are normal. There are no new-formed blood-vessels in the cornea. No bacteria are brought out by the Gram-Weigert stain. The subconjunctival tissue of the limbus is œdematous



SARCOMA OF CHOROID WITH DESTRUCTIVE HEMORRHAGE. (Case 1.)

and shows a chronic inflammatory reaction. Most of the pus cells, however, are entering the cornea from the deeper layers of the sclera. The sclera is infiltrated with pus cells for a considerable distance from the limbus and shows a number of interstitial hemorrhages. The anterior chamber contains a mass of blood in which many pigment cells are to be seen, but in which there is very little fibrin. The iris is adherent to the sclera for about 1.5*mm* and is in a state of advanced atrophy. It shows marked œdema, but is not infiltrated with pus cells. The ciliary body is likewise greatly atrophied and œdematous, and on the nasal side is infiltrated with pus cells. The ciliary processes are small, showing marked hyaline degeneration, and the epithelium has in great part disappeared from their surfaces. The choroid on the nasal side has been overgrown by the tumor. Elsewhere it is atrophic, congested, and œdematous. Near the disc it contains numerous small blood extravasations. The larger choroidal vessels are almost everywhere surrounded by collections of lymphoid cells, and at the equator the chorio-papillaris is packed with pus cells. The optic nerve and retina are œdematous. Over the tumor the latter is greatly atrophied and in places disorganized by hemorrhage.

The mass occupying the nasal half of the globe is found to be a spindle-cell sarcoma. This has grown within the choroid, the inner layers of which form a capsule for the tumor. It extends as far forward as the iris, growing over the surface of the ciliary body. While it is not highly pigmented, there are a number of pigmented cells distributed uniformly throughout the growth. The pigment is autochthonous, consisting of yellowish-brown granules, which are readily bleached by the method of Alfieri and which do not give the iron reaction. The tumor cells are small and fusiform everywhere. The most striking feature of the tumor is the widespread necrosis it shows, almost the entire tumor being completely necrotic. In fact there are only a few areas, situated at the base and near the capsule that stain normal, the cells and their nuclei elsewhere staining intensely in eosin. At the base there are places in which the structure of the choroid can still be recognized, the tissue spaces being dilated and either filled or lined with tumor cells. The tumor is poorly supplied with blood-vessels and is highly œdematous throughout. No pus cells have invaded the necrosed portion, though they are present in some numbers at the base. Along

the base of the tumor there is an almost uniform zone of hemorrhage which anteriorly passes into the necrotic portion, completely infiltrating it. This explains the oval dark red area seen macroscopically. Over the ciliary body the blood has broken through the necrosed capsule and poured almost directly into the anterior chamber, dislocating the lens backwards. The growth has not infiltrated the sclera or optic nerve to a noticeable extent.

CASE 2. **Spindle-cell leuco-sarcoma of choroid. Necrosis of tumor. Expulsive intraocular hemorrhage. Purulent infiltration and spontaneous rupture of the cornea.**

Admitted to the Infirmary, January 19, 1901, service of Dr. Standish. Ann B., house servant, aged fifty. Patient states that two weeks ago she got "sand" in the left eye and that the pain had constantly grown worse. She visited the out-patient department this morning, and on arising from her chair at the call of the surgeon, there came a sudden gush of vitreous humor and blood from her eye. On admission there was found a large perforation of the cornea with infiltrated edges. The eye was soft and still bleeding freely, a large blood-clot hung from the perforation, and there was great chemosis of the conjunctiva. On the following day the eye was enucleated.

Pathological Condition.—(Fixation in 10% formalin.) The globe is normal in size. The cornea is opaque almost throughout and shows a large somewhat eccentric perforation. On section the globe is found filled with blood which extends into the perforation, carrying forward the iris with it. The iris, however, is not torn from its attachment. The lens is absent. The choroid is separated from the sclera by the hemorrhage; the retina cannot be made out. The optic disc is not cupped, and the nerve appears normal. Attached to the ocular wall on the temporal side, and reaching the margin of the optic disc, there is a tumor with a globular head, a neck, and an expanded base. The base averages about 12*mm* in diameter and the head projects 8*mm* into the vitreous chamber. The cut surface of the tumor has a granular appearance, and in general is gray in color, showing here and there many lighter and darker areas and several hemorrhages, but no definite pigmentation. The growth has not penetrated the sclera at any point.

Microscopic Examination.—(Celloidin, hematoxylin, and eosin.)

The subconjunctival tissue of the limbus shows a marked chronic inflammatory reaction. The cornea is for the most part denuded of epithelium, but Bowman's membrane can be traced to the edges of the perforation. The corneal stroma surrounding the perforation has undergone hyaline necrosis throughout its entire thickness, staining strongly in eosin. The necrosis is much more widespread in the posterior layers than in the anterior. Immediately in front of Descemet's membrane, and involving about one-third of the thickness of the cornea, there are necrotic areas almost free from pus cells from which the corneal corpuscles have entirely disappeared, the spaces in which they formerly lay being filled with fibrin and hyaline material. Such spaces are not seen in the anterior layers. In one place, some distance from the perforation, there is a rather sharply defined area of more advanced necrosis filled with granular detritus and pus cells. The Gram-Weigert stain shows no bacteria in this area nor elsewhere in the globe. Descemet's membrane reaches the edges of the perforation and stains well except behind the areas of necrosis. The endothelium is present only over the peripheral portions of the cornea. The spaces of Fontana and the canal of Schlemm are engorged with blood, and the latter is surrounded by a zone of lymphoid cells containing only a few pus cells. The perforation is plugged up with a mass of blood and fibrin in portions of which the lens substance, lens capsule, disorganized choroid, and iris are incorporated, the whole being considerably infiltrated with pus cells. The iris is œdematous and for the most part closely applied to the cornea, being separated from it, however, in some places by blood. Near its root the iris is disorganized by an interstitial hemorrhage, but here its stroma cells stain well and there is scarcely any infiltration with pus cells. As the pupil is approached, however, the iris becomes more and more necrosed until it shows complete hyaline necrosis. On one side the necrotic pupillary margin projects into the perforation and is almost completely disintegrated, being represented by a mass of granular detritus which has been invaded by pus cells apparently coming from the ruptured cornea. On the other side, where the iris does not reach the perforation, there is only an insignificant infiltration with pus cells. A striking feature in this connection is the attraction which the necrotic muscle fibres of the iris seem to have exerted upon the pus cells, for the latter are not only

collected in and about the circular muscle fibres but are strung along the radial (dilator) fibres as well. This is all the more noticeable because the rest of the iris stroma contains so few pus cells. The iris gives no evidence of having previously been atrophic. The ciliary body is congested and disorganized by œdema. It is not infiltrated with pus cells but shows an unusual number of mast cells. The ciliary processes show old degenerative changes, some of them containing deposits of lime salts. On one side, where they have suffered the greatest compression, most of them have undergone complete hyaline necrosis and have for the most part lost their epithelium. On the other side they are not necrotic, and some of them are giving rise to a proliferation of epitheloid cells.

The choroid is everywhere more or less disorganized by œdema and hemorrhage. In most places it is infiltrated with lymphoid, plasma, and pus cells, and is giving off an abundant exudation of the latter into the blood clot. The sclera is œdematous and in places shows small interstitial hemorrhages. The episcleral tissue shows a marked chronic inflammatory reaction. A portion of the separated retina, disorganized by hemorrhage, can be seen near the tumor. In some places the retinal vessels are giving off a slight exudation of pus cells. The optic nerve shows no marked changes. The blood filling the globe is in places coagulated, containing large quantities of fibrin, and is infiltrated with pus cells. In other places it is in a fresher condition and contains no fibrin and no more that the normal number of leucocytes.

The tumor takes its origin from the choroid with which it is in direct connection. The inner layers of the choroid form a thin connective-tissue capsule reaching as far as the neck, but from the latter inward the tumor is closely invested by the retina, which is here greatly atrophied. There is no connective tissue between the tumor and the retina, and the pigment epithelium has almost disappeared, the only remains of it consisting of a few pigment cells which have migrated into the retina. The tumor is composed of spindle cells of moderate size, none of which contains pigment. The cells have no alveolar arrangement. Karyokinetic figures are fairly numerous. Although the tumor is richly supplied with thin-walled blood-vessels, it is extensively necrotic. The central portion of the tumor has undergone complete hyaline necrosis, the cells and nuclei staining intensely

in eosin. The necrotic area contains many broken-down pus cells and is full of extravasated blood. It takes up fully half of the tumor, and at two points reaches the surface where it is in continuity with the blood in the vitreous chamber. Strange to say, the necrotic area seems to possess more blood-vessels than the other parts of the tumor. At the periphery of the necrotic area, especially near the sclera, the tumor is œdematous, the cells being greatly swollen and many of them becoming almost round in shape. The tumor cells have not invaded the sclera or the optic nerve.

CASE 3.—**Melanotic round-cell sarcoma of choroid. Expulsive intraocular hemorrhage. Purulent infiltration and spontaneous rupture of cornea.**[8]

Admitted to the Infirmary, March 14, 1900, service of Dr. Jeffries, William F., cigar peddler, white, aged sixty-four. First noticed impairment of vision in left eye in 1897. This year he had a painful attack, evidently of acute glaucoma, lasting about three weeks. After this the eye remained free from pain for two years, when it again became inflamed and painful. Four weeks later the patient was seen by a surgeon, the eye at this time presenting the appearance of glaucoma and the cornea showing complete yellowish infiltration. The pain continued for one week, when he suffered an especially severe attack lasting through the night, after which the eye became quite comfortable. A few hours later, while quietly talking with his wife, he was suddenly attacked with a severe pain in the eye from which there immediately followed a profuse hemorrhage. The eye was enucleated about five hours later.

Pathological examination of the enucleated eye showed a slightly melanotic sarcoma of the choroid about $7mm \times 7mm \times 13$ mm in size, attached to the sclera on the nasal side and extending over the disc. Most of the tumor cells were round, but some were spindle-shaped. The optic disc was deeply cupped. The globe was disorganized and filled with blood, a large blood clot projected through the ruptured cornea, and the latter was greatly infiltrated with pus cells.

REMARKS.

In Case 1, the source of the hemorrhage was the anterior portion of the necrotic tumor, the blood having broken

through the capsule. The cornea was so infiltrated with pus cells that had the eye not been enucleated it must have ruptured in a short time. In Case 2, the hyaline necrosis of the iris, the purulent exudation from the choroid, and the fact that the posterior layers of the cornea were more necrotic than the anterior, show clearly enough that a hemorrhage occurred in the globe before the rupture of the cornea took place. The source of the hemorrhage, in this case too, could have been nothing else than the large area of necrosis in the tumor, the hemorrhage from the choroid no doubt being secondary to the rupture. At the time Case 3 was first reported, the question as to whether the hemorrhage was primary or secondary to the rupture of the cornea was left undecided. The following additional observations, however, seem fully to justify its classification with the other two cases. In the first place, the condition of the cornea was much the same as in Case 2, the posterior layers being more necrosed than the anterior, a condition that could scarcely be accounted for except on the assumption of pressure from behind. Sections stained by the Gram-Weigert method, as well as sections stained in carbol-fuchsin twenty-four hours and decolorized in 70 per cent. alcohol, showed no bacteria in the cornea. An extensive portion of the choroid was not disorganized by hemorrhage, but densely infiltrated with pus cells. This condition must have obtained previously to the rupture, because it could not have come about within the short space of five hours which intervened between the time of the rupture and the enucleation. Although most of the blood filling the globe was in a fresh condition, portions of blood clot containing large quantities of fibrin and densely infiltrated with pus cells were found which were evidently the remains of the original hemorrhage. Finally sections, bleached and unbleached, stained for iron in ferro- and ferri-cyanide of potassium followed by acid alcohol, showed that the pigment epithelium of the retina and the *pars ciliaris retinæ* contained large quantities of iron pigment. According to the clinical history, if the hemorrhage was primary it probably occurred five weeks previous to the enucleation, which would have been ample

time for the deposition of iron pigment. In Cases 1 and 2, in which no iron pigment could be found, the hemorrhage must have occurred, in the former four days, and in the latter about two weeks, before enucleation.

Strangely enough, the writer has been unable to find reported any cases of choroidal sarcomata similar to these. Among the 8 cases of Knapp,[1] 21 cases of Fuchs,[2] 94 cases of Lawford and Collins,[4] 24 cases of Freudenthal,[3] and 41 cases of Kerschbaumer,[6] there were none of this nature. A search through thirty-eight specimens of choroidal sarcoma in the laboratory of the Infirmary brought to light no additional cases. A fourth case, however, was found in a collection of seventeen specimens obtained from various laboratories in Europe.* This case was very similar to Case 1, though the exact source of the hemorrhage could not be determined owing to the fact that only a small part of the tumor was included in the section. The tumor was a highly melanotic mixed-cell sarcoma. The vitreous chamber contained a large quantity of blood; the choroid and ciliary body were disorganized by œdema and hemorrhage, and infiltrated with lymphoid and pus cells. A sufficient amount of blood still adhered to the cornea and iris to show that the anterior chamber had been full of blood during life. The cornea was highly œdematous and infiltrated with pus cells. Many of the corneal corpuscles were necrotic, and the corneal spaces were often filled with fibrin. The endothelium contained large numbers of pigmented pus cells. Unfortunately, no information regarding the clinical features of this case is at hand. Thus out of a total of 243 unselected cases of choroidal sarcoma, there were only 4 cases of destructive hemorrhage.

While it would seem, therefore, that such cases are rare, the writer is inclined to believe that they are sometimes overlooked. They could easily be mistaken for cases of hemorrhagic glaucoma, glaucoma from hemorrhage, or, when seen in a late stage, for primary ulcerative keratitis. And even after enucleation, it might happen that the tumor

* These specimens were kindly loaned by Dr. G. S. Derby, of Boston.

would escape notice in the mass of blood filling the globe. In Case 1, owing to the tumor being necrotic and largely infiltrated with blood, the writer was uncertain until after the microscopic examination whether or not he had to deal with a new growth, while in Case 3 the tumor was discovered almost by accident. Since the occurrence of the latter case, which was the first of the kind met with, the writer has examined all enucleated globes containing blood with special reference to the possible presence of a tumor, the three cases here reported occurring in a consecutive series of seventeen cases of choroidal sarcomata (17.6 per cent). Whether or not it is safe to regard this as a fair estimate of the frequency of expulsive hemorrhage in these tumors it is difficult to say, but it is in accord with *a priori* reasoning.

Even aside from destructive hemorrhages, little or no attention seems to have been paid to the subject of hemorrhage in connection with choroidal sarcomata. None of the authors mentioned above attach any importance to it, except as it concerns hematogenous pigmentation, and none of them give it as a possible cause of glaucoma. It is hardly to be doubted that hemorrhage must be responsible for the sudden attacks of glaucoma in many sarcoma cases. In the descriptions of cases it is mentioned so seldom that it must have been disregarded in a large number. In microscopic preparations of old material, the blood is apt to stain poorly, so that in some cases this may account for its being overlooked. Among the fifty-five specimens examined by the writer, comparatively large hemorrhages were present in twenty-five cases. It is noteworthy that purulent infiltration of the cornea was present only in the four cases of destructive hemorrhage. Necrosis of the tumor was a marked feature in twenty-one cases, all with hemorrhage, and seems, therefore, to be the most common cause of hemorrhage. The necrosis in turn is probably most often due to anæmia resulting, either from a degenerated condition of the vessels, or to compression of the latter by the tumor. In some cases it is likely that the necrosis is the result of the extravasation instead of *vice versa*. In rare cases hemorrhage takes place from the atrophied choroid, iris, or ciliary body.

In this connection the writer would like to call attention to the probability that some of the cases of choroidal sarcoma with phthisis bulbi are due to the organization of a blood clot in the vitreous chamber.

The clinical diagnosis in a case of choroidal sarcoma with marked intraocular hemorrhage is a matter of difficulty. Such a case could scarcely be differentiated from one of primary hemorrhagic glaucoma. The clinical history would not, as a rule, be of much service, for in both cases it would be very similar as regards previous attacks of pain and loss of vision. In Case 1, however, the history of a gradually increasing positive scotoma was strong evidence in favor of a sarcoma, and in fact the diagnosis was correctly made in this case before enucleation. Objectively, about the only point of importance is the absence of glaucomatous changes in the fellow-eye. Fortunately, an accurate clinical diagnosis is not of much consequence, since a destructive intraocular hemorrhage from any cause would indicate enucleation, if only to relieve pain. Disastrous as such a hemorrhage seems to the patient, in thus making plain both to the latter and to the surgeon the advisability of enucleation, it is really to be regarded as a fortunate outcome of the case.

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A CASE OF EMPYEMA OF THE RIGHT FRONTAL SINUS, OF THE RIGHT SPHENOIDAL SINUS, OF BOTH ANTRA OF HIGHMORE, AND OF THE ETHMOIDAL CELLS ON BOTH SIDES.

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The following case seems worthy of record:

L. P., female, age forty-seven, came under my care on March 23, 1903.

For ten years she had suffered from severe pain in the frontal region on the right side, and there had been a purulent nasal discharge for the same period on the same side. Two years ago a painful swelling appeared above the right eye; this was incised by a surgeon in another part of the country. This incision never completely healed, a sinus being left from which pus discharged intermittently.

Some nasal obstruction had been present for eighteen months.

A sinus, admitting a probe to the depth of one and a half inches, was present at the upper and inner margin of the orbit. Examination of the nose showed that the middle meatus on each side was filled with polypi bathed in pus.

Operation.—Ether was administered. The anterior ends of the inferior turbinate bones, the greater part of both middle turbinates, and numerous polypi were removed. The ethmoidal cells were found much disorganized and full of pus and small polypi; they were thoroughly curetted. The antra were then opened in turn through the canine fossa, and found full of pus and polypi; these were thoroughly removed, and in each case an opening made into the nose through the anterior part of the in-

ferior meatus, where it had been exposed by the removal of the anterior portion of the inferior turbinate bone. The antra were packed with gauze, the ends being brought out through these nasal openings, and the incision through the mucous membrane of the mouth over the canine fossa allowed to close.

The frontal sinus on the right side was then exposed by a curved incision through the line of the eyebrow. A portion of the anterior wall was removed with a gouge, chisel, and mallet, and the cavity found to contain pus and granulation tissue. The lining membrane was extensively diseased and was curetted away, the whole anterior bony wall of the sinus being subsequently removed. A prolongation of the cavity was found extending a considerable distance backwards, and communicating with the anterior ethmoidal cells, all of which contained much pus and granulation tissue.

The dura mater over the inferior frontal lobe was exposed in the removal of the diseased bone.

The sinus and the accessory cavity were packed with gauze, and only the outer half of the incision closed with sutures.

The subsequent course was uneventful. The packings were removed from the antra after thirty-six hours and not replaced, the cavities being syringed out daily through the openings made into the inferior meatuses.

The frontal sinus was freshly packed each day until healthy granulations had sprung up, when the packing was gradually reduced in amount and the sinus obliterated by pressing in the soft parts from the front.

The subsequent deformity was not marked and six months after the operation was hardly visible.

Suppuration from the antra and frontal sinus entirely ceased, but slight discharge persisting into the naso-pharynx; the sphenoidal sinus was examined with the probe. Pus could be seen to exude from the orifice after the withdrawal of the probe. Accordingly the anterior wall of the sinus was removed, the lining membrane curetted, and the cavity washed out. In a very short time all discharge ceased.

This case illustrates well the difficulties encountered in the treatment of these conditions. The diagnosis of empyema of the right frontal sinus was easily made. A purulent discharge into the middle meatus of the nose and a

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sinus under the eyebrow at the inner side of the orbit, from which pus was intermittently discharged, severe pain being experienced whenever the discharge ceased, allowed no doubt as to the condition.

If, however, the anterior wall of the sinus had not been fully removed, it would not have been possible to detect the presence of the backward prolongation communicating with the anterior ethmoidal cells. In this space the disease was far advanced and the dura mater exposed. The operation at times adopted of making a small opening into the sinus, curetting and enlarging the natural opening into the nose, subsequently closing the skin incision, would have been entirely useless, and would probably have been shortly followed by disastrous consequences.

No operation upon disease in the immediate vicinity of the brain can be considered adequate that does not permit of a thorough inspection of the parts affected. Some cases may certainly lose their pain, and may even be fortunate enough to lose the nasal discharge, after the performance of an imperfect operation; as in bygone days, recovery from mastoid disease would sometimes follow the removal by a trephine of a small disc of bone from the cortex of the mastoid.

The simple removal of the nasal polypi by the snare or forceps would have given relief of the most temporary character to the nasal obstruction and suppuration. It may be laid down as a definite rule, that in all cases of multiple nasal polypi with purulent discharge the antra of Highmore must be explored. In the large majority of such cases, more or less extensive disease of the antra will be found, and a radical operation must be performed. The method of Caldwell-Spicer, described above, is one of the most effective and satisfactory in its after-results. In these cases also, the ethmoidal cells will usually be found to be the seat of disease. This must be treated by thorough curettage of the affected parts.

The diagnosis of chronic suppuration in the sphenoidal sinus can only rarely be made, except by exclusion of other sources of suppuration, or, as in this case, by elimination.

Except in cases of atrophic rhinitis, the orifice of the sinus cannot be seen until after the removal of the middle turbinate. A probe marked in centimetres is used, and passed in the direction of a line joining the inferior nasal spine and the position of the middle of the inferior margin of the middle turbinate bone. The orifice will be encountered at a distance of 6.5*cm* to 7.5*cm* from the nasal spine. If the sinus is successfully entered the probe will be in the position indicated, the tip will be in a distinct cavity, it will not be possible to move it downwards, and it will be 7*cm* or more from the nasal spine. The subsequent withdrawal will be followed by a drop or more of pus. The anterior wall must then be removed by the special cutting forceps devised by Grünwald, or torn away by the hook of Hajek.

The surgery of the frontal sinus and of the other accessory cavities of the nose is still in process of evolution. The surgery of the temporal bone has passed through similar stages. From the small opening made with a carpenter's gimlet, advocated by Treves so recently as 1891, to the radical mastoid operation of to-day, a striking change is evident.

The operations on the accessory cavities of the nose, which will ultimately be adopted, will proceed upon similar lines, to the present mastoid operation, and must permit of the exact determination of the extent of the disease, and of its complete removal.

HEMORRHAGES IN THE EYE, PRESENT AT BIRTH.

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(*With three figures on Text-Plate XI.*)

THIS study was undertaken to ascertain, if possible, the reason for poor vision in certain eyes which present no appreciable changes in the fundus of the eye commensurate with the diminution of vision.

Ophthalmoscopic examination of amblyopic eyes sometimes reveals a peculiar stippling or an unusual arrangement of the retinal pigment, but not necessarily beyond the range of mere physiological variation. Often these eyes squint, and, if in adults, *ex anopsia* is usually assigned as the reason for the poor sight. A restoration of the visual axes by operation and glasses do not increase the visual acuteness. I have had the opportunity to examine the eyes of a number of young infants, the unnatural behavior of whose eyes had attracted the parents' attention. Peculiar retinal pigmentation, diminution in the size of the retinal vessels, pallor of the disc, feeble pupillary reflex phenomenon, with pupils sometimes large and with uncertain or nystagmic movements of the eyes, were some of the conditions noted, either one or some combination of the above complex of symptoms being present. With the above changes appearing at such an early age, it seemed necessary to seek for the cause at the very threshold of life—at childbirth or before.

While such investigations have been made before, the details surrounding each case have not been sufficiently

FIG. 1.

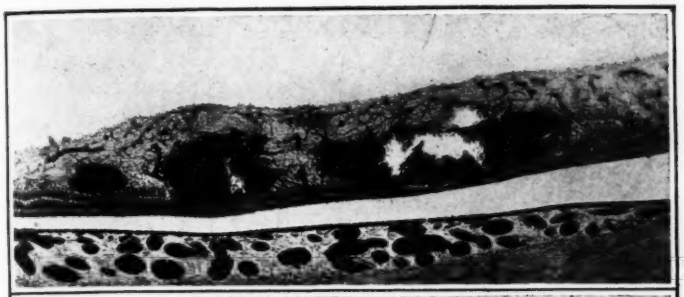

FIG. 2.

FIG. 3.

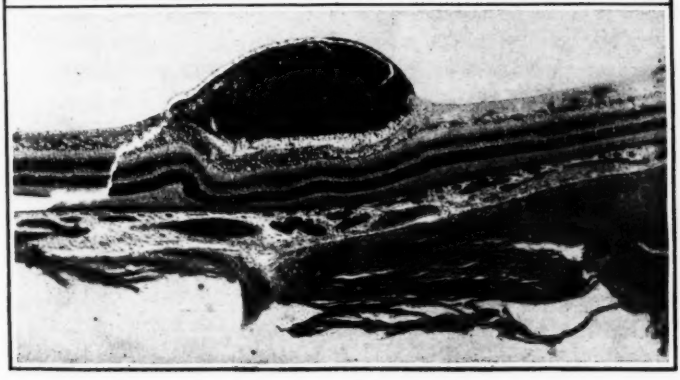

FIG. 1.—Retinal hemorrhages in the nerve-fibre layer, displacing and compressing the normal tissue.

FIG. 2.—Retinal and choroidal hemorrhage; rupture of the lamina vitrea. The retina is detached by blood coming from the choroid through a rupture in the lamina vitrea. Diffuse hemorrhage in the nerve-fibre layer.

FIG. 3.—Subhyaloid hemorrhage, in its usual rounded form.

recorded to enable a proper estimation to be made of the causes of these changes.

Laceration of the lids, injuries to the cornea, expulsion, avulsion, and rupture of the eyeball, retroversion of the lens and vitreous body without rupture of the eye, and hemorrhages into various parts of the eye are some of the injuries to the eye recorded as occurring during birth.

In addition, there may occur to more distantly related parts, indentation of the skull from pressure of the sacral promontory, fracture of the bones of the skull, epidural, subdural, and intracerebral hemorrhages. These injuries resulted during normal and instrumental delivery in mothers with a deformed pelvis.

The prenatal period of the infant's life is often a strenuous one from the moment that labor begins. In normal labor of a primipara, the dilatation of the parts is accomplished by enormous uterine *vis a tergo*, acting through the fœtus, whose head serves as a battering ram to force the passage. In turn, the head is greatly compressed and suffers a moulding of the bones in its passage through the parturient canal. Hours and days are often passed before the child is born, during all of which time the pressure is maintained and periodically increased.

A multigravida with roomy pelvis and relaxed tissues offers little resistance to the passage of the fœtus, and in a few hours, or perhaps minutes, the process is terminated in the birth of the child. With deformed pelvis, or where for any reason instrumental delivery is necessary, the pressure is greater and is perhaps maintained longer and the danger is correspondingly increased.

A large fœtus with a large head, or, in fact, any condition that may make labor protracted, is a possible cause of retinal hemorrhages. At the termination of labor, the transition from the birth canal to the outer world is sudden, causing additional strain. With the exit of the head (in vertex presentations), the pressure on the body is maintained and the blood is forced into the head, which is now the only part of the child in a relieved state and free from pressure.

The congestion of the fœtal head produced by com-

pression during its passage through the obstetrical *via vitæ* is extended to the eyes also, and dilatation of the minutest capillaries is the usual occurrence.

Diapedesis and rupture of the vessels lead to extravasation of blood into the tissues. The tissues are separated, distended, and compressed in different ways, suffering from the abnormal presence of blood in the tissues outside of the blood-vessels.

Ophthalmoscopic Examination by Other Observers.

In 281 personal observations Königstein found retinal hemorrhages in 29 cases, about 10 per cent. Among 150 children ranging in age from birth to eight days, Schleich found 78 eyes affected in 49 cases, about 33 per cent. In a week absorption of blood had usually occurred and only slight cloudiness of the retina remained. In one case he found hemorrhage of the retina eleven days after birth, but the blood corpuscles were changed.

Bjerrum found only 3 per cent. of the cases he examined affected with retinal hemorrhages.

De Vries examined 112 cases with the pupils dilated and found retinal hemorrhages in 11 per cent. of the cases. In 150 new-born children examined by Montalcini from ten minutes to two days after birth, 25 per cent. had hemorrhages in the retina, while nearly 18 per cent. had the hemorrhages in both eyes.

These hemorrhages, which were mostly at the posterior pole of the eye are, according to these observers, monocular or binocular, and roundish, irregular, striped, or radiate. Montalcini accepts the opinion of Schleich, who believes that venous stasis during the normal labor and, still more, dystocia play the principal rôle. He also considers the constitution of the fœtus of importance, for most of the infants showing retinal hemorrhages were in bad health; all infants showing retinal hemorrhages were head presentations, and prolonged labor also seemed to be a factor; while these hemorrhages occurring by diapedesis absorb quickly, he states they may often represent the origin of functional troubles of the eye, and suggests therefore that we ought

to attend to the mother to ascertain faulty conformation of the pelvis and regulate the mechanism of labor.

Microscopical Examination by Other Investigators.

Naumhoff made an examination of the eyes of 47 children who had died shortly after birth, and found changes in 12, or about 25 per cent. The hemorrhages were chiefly in the nerve-fibre and ganglionic layers, with blood infiltration of the tissues. In the macular region, hemorrhages had pressed apart the fibres in the inner nuclear layers. The blood was in fine stripes in the outer layers of the retina, and caused detachment of the retina. In the retinal capillaries tears were sometimes found. Extravasated blood was only observed three times in the choroid and once near the macula with detached retina. Naumhoff believes in a stasis due to cerebro-spinal fluid blocking up the sheath of the optic nerve (as in brain tumor) from the pressure. This causes both diapedesis and rupture of the capillaries.

Von Hippel found hemorrhages in 10 out of 24 cases, or about 41 per cent. The blood was chiefly in the anterior part of the retina in the region of the ora serrata, and sometimes distributed over the whole fundus; seldom in the optic nerve or choroid, and never in the ciliary body, iris, anterior chamber, or sclera. He found the region of the fovea often involved. In some sections blood was observed to have forced its way outward from the inner nuclear layers to the vitreous membrane and had collected there, causing detachment of the retina. Hemorrhages were also found in the papilla. He calls attention to the possibility of the formation of blood cysts from this cause. The hemorrhages in the retina are frequent, and may be the cause of congenital amblyopia or of the so-called macular coloboma.

In a case reported by Wintersteiner of a child whose eye was injured in instrumental delivery, a microscopic examination showed that the anterior chamber was filled with blood, and the ciliary bodies, the suprachoroidal space, the choroid, and sclera contained extravasated blood. He states that hemorrhages are usually found in the posterior segment of

the eye, and that hemorrhages in the anterior part were probably due to the pressure of the forceps.

Axenfeld states that he has seen abundant hemorrhages in the eyes of infants a few days old, but they all contained hematoidin, which seemed to prove that they did not occur during birth but during intrauterine life.

Wintersteiner could find no rupture of the vessel walls, and thinks the rupture may have closed by the time of death. In view of Schleich's observations as to the rapid absorption of the extravasated blood, Axenfeld's conclusion does not seem to be warranted.

Ammann, in speaking of retinal hemorrhages in general, states they may occur from diapedesis, or by rupture of the vessels, the latter being mostly due to trauma. They may also occur from muscular strain, but in these instances he presupposes vascular changes. He also states that the effect on the retina is probably due to mechanical pressure.

Tepljaschin, in experimental injuries of the retina, shows that division of the retinal nerve fibres causes ascending and descending degeneration of the nerve fibres, with degeneration of the ganglion and other cells of the retina.

Chas. S. Bull, in discussing retinal hemorrhages, states that degeneration of the vascular coats in the young causes subhyaloid hemorrhage. If in the vitreous and extensive, the prognosis is grave, as blood comes from the peripheral vessels. Any fundamental disease, as inherited syphilis, which causes abnormal brittleness of the vessel walls, is influential. Simple retinal hemorrhage, without retinitis, indicates increased blood pressure, a disease of the blood-vessel walls, or a morbid condition of the blood, or all three. Recurrent retinal and subhyaloid hemorrhages in the young are of slight prognostic importance, especially if due to inherited or acquired syphilis.

In an article on "Retinal Hemorrhages as Diagnostic of Fracture of the Base of the Skull and Subarachnoid Hemorrhages," Ballantyne concludes that a subarachnoidal hemorrhage, if sufficiently rapid, will cause retinal hemorrhage, or, if the effusion is unilateral, the hemorrhage will be confined to the same side. It is difficult to explain why the

sinus basalis does not distribute equally to both optic-nerve sheaths, though he believes that this peculiar fact may be explained by hydrostatic principles. Blood enters from the sinus basalis, and not from vessels of the pial sheath.

Presumably a sudden distention of the inner sheath space just behind the eyeball causes great increase of pressure in retinal vessels and rupture.

Unilateral hemorrhages occur in unilateral subarachnoidal hemorrhages.

The Author's Studies.

These studies were conducted in the laboratory of the College of Physicians and Surgeons, and for the opportunities afforded I am greatly indebted to Dr. T. M. Prudden.

The eyes of 37 infants who had died at a maternity hospital were examined. These were either still-born or had lived for varying periods up to twenty-two days. The eyes were removed and placed in Orth's fluid, and after hardening in successive alcohols of increasing strength were imbedded in celloidin and cut in serial sections. Staining was either *en bloc* in alum carmine or in sections with hematoxylin and eosin.

Author's Observations.

Macroscopical.—On opening the eyes it was often possible to see the hemorrhages with the unaided eye, or by viewing the divided eyeball with transmitted light. These had the appearance of brownish spots, usually circular in form, though often flame-shaped and striated, occasionally presenting the appearance of several having coalesced. Contrary to the findings of other investigators, most of the hemorrhages were found in the equatorial part of the eye, up to the ora serrata, the posterior part, in particular the macular region, presenting fewer extravasations. In only one case did the blood appear to have penetrated into the vitreous. Detachment of the retina in the usual papillo-macular fold was generally observed, and where other detachments were noted they were usually linear, following the course of the blood-vessels, while the vessels themselves could frequently be seen at the top of the fold.

Microscopical.—A fact worthy of note is the customary intense congestion of the eyes of the new-born, fully four-fifths of the eyes examined showing the vessels gorged with blood even where there had been no extravasation. This natural injection of the vessels and capillaries of the retina reveals the fact that the retina is not so sparsely supplied with blood-vessels as is ordinarily supposed.

Hemorrhage anterior to the iris is comparatively rare, blood on the anterior surface of the iris and in the meshes of the pectinate ligament being observed but once. Blood in the outer layers of the sclera was seen five times. Choroidal hemorrhage was not observed, though in one instance the lamina vitrea was ruptured at the ora serrata (see Fig. 1, Text-plate XI), and blood, evidently from the choroid, had passed through the break, causing detachment of the retina. Suprachoroidal hemorrhage was observed once. The retina was the chief site of the extravasation in all of the 17 cases in which hemorrhage was found. Hemorrhage in the optic-nerve head was noted 4 times, in the optic-nerve sheath 5 times, in the subretinal fluid 3 times, and in the subhyaloid 4 times. The vitreous was involved only twice, though blood corpuscles were found in some cases where the extravasation appeared to be subhyaloid only.

Hemorrhages were most frequent in the inner layers of the retina, especially in the nerve-fibre layer (see Fig. 2, Text-plate XI) (in which the large blood-vessels lie), and in the layers contiguous thereto—the ganglion and the molecular or plexiform layers. The extravasation in the nerve-fibre layer was usually somewhat linear in form, the blood probably following the line of least resistance, the cleavage being parallel to the course of the nerve fibres. Next in frequency the hemorrhages occur in the outer molecular and the ganglion layers in which the smaller blood-vessels are located. Differing, however, from the hemorrhages in the nerve-fibre layer, these extravasations were usually circular or oval when they were of considerable size. The limitans externa seemed to form a natural barrier to the escape of blood toward the columnar layer. This layer was ruptured in several cases, and blood was observed in a con-

tinuous line from the middle region of the retina to the pigment layer and the lamina vitrea, where it was heaped up, causing detachment of the retina at that point. In every instance but one where this had occurred, the pigment cells were undisturbed except in places where the lamina vitrea seemed to be ruptured. The subhyaloid hemorrhages (see Fig. 3, Text-plate XI) were usually massive with rounded outlines and had occurred as the result of rupture of the blood-vessels lying close to or on the inner surface of the retina, as the most common form of extravasation was diffuse, consisting of only a few red blood cells scattered here and there through the tissues. It is quite possible to believe that these were caused by diapedesis, but rupture of the blood-vessels must have occurred to produce the large collections of blood seen in some eyes. The disrupting effect of these hemorrhages is another proof of the rupture theory, as large cavities entirely filled with blood were seen wherein were no signs of retinal elements to be seen. The extravasations of blood in the sheath of the optic nerve were not large but consisted usually of a few corpuscles lying free in the intervaginal space. There was no evidence of distention of the sheath, though this might very well have existed during birth and subsided after the removal of the compression of the head from the birth canal and the length of time which elapsed between the birth, death, and final examination of the eyes. Unless the extravasation had been local or there had been profuse hemorrhage in the cerebro-spinal fluid, marked evidence of such extravasation could not be expected. The blood must have been very greatly diluted by the relatively large quantity of the cerebro-spinal fluid, and on the return of the fluid to the subdural lymph spaces only a few corpuscles would become stranded in the meshes of the lymph spaces surrounding the optic nerve.

Remarks.[1]

Childbirth usually causes intense congestion of the head and its contents, and the eyes are probably the greatest

[1] Deduced largely from the tables.

sufferers from hyperæmia occurring at that time. Retinal hemorrhages occur chiefly in vertex presentations, as the head is then the part which causes dilatation of the parturient canal and suffers most. In breech presentations the head follows in the canal already dilated.

Extravasations are more apt to occur in congenitally weak children. This is shown by the fact that the average life of these children is less than that of children not so affected. Long and dry labors, infants with large heads, mothers with deformed pelves, and instrumental delivery are contributing causes. Conversely, small children, short labors, large and roomy pelves and vaginæ, are conditions which favor birth without ocular hemorrhages. This applies also to premature and induced labors, as in these cases the infants are not fully developed. While it has not been proven that forceps delivery is a cause (and statistics on this point ought to be secured where forceps are used without deformity of the pelvis), still, forceps are probably used where labor is prolonged, the head is large, or the pelvis is deformed, all being conditions where unusual or long-continued compression of the head is maintained. In many lying-in hospitals forceps are always used if descent of the head does not follow in two hours after the os uteri has been sufficiently dilated for its passage.

Subjects with hemophilia or with hemorrhagic tendencies, should be regarded with suspicion, and birth should be facilitated as much as possible. Hemorrhages in the eyes of colored infants are more frequent than in those of white parentage. Extravasations are often visible two weeks and longer after birth, a point which must not be forgotten, and which may be of some diagnostic importance in making microscopical or ophthalmoscopic examinations of infants' eyes. The frequency of retinal hemorrhages is remarkable and somewhat difficult to explain when contrasted with the infrequency of choroidal hemorrhage and the exceedingly vascular structure of that membrane. The free anastomosis of the choroidal vessels compared with the terminal arteries in the retina with their lack of intercommunication should not be forgotten. Another element tending to cause these

hemorrhages (and which we must remember are limited solely to the retina) is suggested by our knowledge of the effects of cerebral tumors, and the dilatation of the optic-nerve sheath (which is a cul-de-sac of the cerebral lymph spaces) with the cerebro-spinal fluid, and the consequent compression of the optic nerve and the central vessels of the optic nerve and retina. A consideration of the circulation of the eyeball will convince us that this is the only place where such a compression of the vessels supplying the retina can take place without effecting a corresponding change in the vessels which supply the other coats of the eye. The occasional finding of a few blood corpuscles stranded in the sheath of the optic nerve is partial evidence of this statement. As has already been suggested, the cerebro-spinal fluid returns immediately to the cerebral lymph spaces after birth, leaving practically no trace of its former presence, except its secondary effect in producing retinal hemorrhages.

Relation of Retinal Hemorrhages to Impaired Vision.

Hemorrhages in the eyes of new-born infants suggest difficult or protracted labor, and are apt to be found in infants of low vitality. Of course the traumatism of birth may be so severe that life may not be possible, or even desirable, with injuries resulting in paralysis, blindness, or other defects.

These hemorrhages, if numerous and sufficiently extensive, may cause defects in the retina, with destruction of the ganglion cells and nerve fibres, and ascending and descending degeneration of the nerve fibres, detachment of the retina, and colobomata—all of these conditions producing blind spots (scotomata) in the field of vision. If the hemorrhages are subhyaloid, they are probably absorbed, leaving no trace of their presence behind. If they penetrate the vitreous, they may disappear without any sign being left. It is a question whether they may not be the origin of certain forms of angioid streaks or connective-tissue formation in the retina. Whether retinal hemor-

rhages have any relation to retinitis pigmentosa is also a matter of interest. Hemorrhages at the macula may be sufficiently destructive to cause great impairment of vision, loss of central fixation, and subsequent strabismus. If the hemorrhage is subretinal, absorption or disturbance of the retinal pigment may occur, destruction of the layer of rods and cones, and even detachment of the retina.

Conclusions.

While the cases here recorded are too few in number to permit definite conclusions, certain probabilities are suggested. The statistics herein presented are taken from cases which were congenitally weak or unable to survive the traumatism of birth. The proportion of those affected with retinal hemorrhages ought rather to be taken from observation of living children. Although the ophthalmoscope does not reveal the finer or more peripheral changes, only the microscopic examination of the eyes of infants who have died shortly after birth, and in whom the effects of birth may be excluded, will give the proper proportion.

Childbirth causes congestion of the head and eyes.

Vertex presentations produce greater congestion than breech presentations.

Long and complicated labors are causative factors.

The retina is the structure most frequently affected, and is often the site of extravasation of blood from the retinal vessels.

The probable cause of retinal hemorrhages is a disturbance of the retinal circulation resulting from compression of the optic nerve and its central blood-vessels due to a distention of the optic-nerve sheath with cerebro-spinal fluid from compression of the head occurring at birth.

The colored race and persons of a hemorrhagic diathesis are most susceptible to this form of traumatism.

While the percentage of children in whom these hemorrhages occur is relatively large, yet their destructive effect is very limited, the blood generally being absorbed without

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ERRATUM.

The Details of Cases on pages 282–284, and the table and the references on pages 285, 286, should have been printed at the close of Dr. Edward B. Coburn's article on "Hemorrhages in the Eye, Present at Birth," and should have followed the matter on page 267.

leaving any trace ophthalmoscopically, or any appreciable defect in the field of vision.

These hemorrhages may cause sufficient injury to affect the visual acuteness or the field of vision, and may leave ophthalmoscopic evidence of their previous existence.

For Details of Cases, Table & References see p. 282

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PARALYSIS OF THE ASSOCIATED LATERAL EYE MOVEMENTS, PRESUMABLY DUE TO ACUTE POLIENCEPHALITIS SUPERIOR, ENDING IN RECOVERY.[1]

By Dr. H. GRADLE, Chicago.

THE case upon which this report is based is of interest both on account of its unusual features and course, as well as the etiologic problems connected with it.

Mr. B., a cigarmaker, unmarried, thirty-four years of age, had hitherto been in fair health, but considered himself nervous, and stated that his virile strength had decreased for some years. He also complained of heartburn and other slight dyspeptic symptoms. Two years ago he was treated for iritis of the right eye, which had left no residues. He denied syphilis and showed no evidence of it. No excesses in tobacco and alcohol. Four weeks ago he had a cold in the head without headache, but his head has been "full" ever since and he has been dizzy. Following the cold, he saw double in the vertical plane for a few days. This soon disappeared, but was followed by persisting lateral diplopia. His sight had also become dimmed, more so in the right than in the left eye.

Status Præsens, March 27, 1895.—A fairly nourished man, with no pain, but slight almost constant vertigo, increased by using his eyes, but not ceasing entirely on closing them. His gait is slightly unsteady, and with eyes shut he staggers on walking. But even with closed eyes he can stand firmly. Knee jerks exaggerated. Temp. 99°. Tongue good. Bowels normal. The closure of the eyelids is not perfect, but otherwise the facial nerve is intact. There is a noticeable fibrillary twitching of the

[1] Read before the Chicago Neurological Society, January 28, 1904.

orbicularis muscles. The eyes show no objective anomaly. Pupils and fundus normal. V R $\frac{20}{120}$; L $\frac{20}{50}$. Correction of a low compound myopic astigmatism (sph. 0.5 with cyl. — 0.75 ax. 0) does not improve sight materially. Accommodation, visual field, and color sense normal. No scotoma. There is total inability to move the eyes to the right or to the left, but the converging power is normal. The up-and-down movements are perfect. On looking forward or downward, the right eye deviates 10 to 15 degrees inward, the left being used for fixation; on looking up, the convergent squint changes to slight divergence (action of intact oblique muscles). There is a constant slow vertical nystagmus.

He was put on a single cathartic dose of calomel and iodid of potassium, soon increased to 4.00 three times per day. Within a few days the slight weakening of the orbicularis muscle ceased, but not the twitching, which even increased and spread somewhat during the next few months. The dizziness ceased in less than six weeks, before the diplopia had fully vanished. Lateral movements of the eyes began within six days and were perfect after the lapse of six weeks. There remained, however, a slight convergent strabismus for four months, at the end of which time binocular vision had become perfect, while some esophoria persisted. As lateral motion increased, the original constant vertical nystagmus ceased, but oscillatory movements of the eyeballs took place whenever the eyes were turned to the utmost in any direction, and these oscillations were in the plane of the forced deviation.

The sight began to improve from the first day, before the iodid could have been of influence. At the end of six weeks, vision was: R E $\frac{20}{50}$ (corrected $\frac{20}{30}$); L E $\frac{20}{50}$ (corrected $\frac{20}{40}$ —). About three months later there was a slight but positive improvement in these figures.

He continued the large doses of iodid, with some intermissions, until October, when he was put on mercury. Although he felt subjectively well, it was noted at that time that the nystagmic movements had increased, and were now accompanied by corresponding oscillations of the head. But all this occurred only on extreme turning of the eyes in any direction.

A fortnight later he returned with slightly sore gums and feeling badly, evidently from the mercury. This was now stopped and the iodid resumed. The eye muscles were normal. While

his vision had not changed, he claimed he could not read except momentarily. The accommodation seemed scarcely enfeebled. He complained of dimness towards the right side yet the visual fields were practically normal. The papillæ seemed rather pale in the temporal half, especially in the right eye. The accuracy of this note was confirmed by the more pronounced pallor noted during the next three months.

Ten days later (November 22d) his central vision seemed to him unchanged for the distance, yet the hitherto better left eye showed now only $\frac{20}{40}$ V (uncorrected). Reading was almost impossible, although he could accommodate fairly. The increased dimness towards the right side was confirmed by a trifling restriction of the visual field on the right side in either eye, the outlines being otherwise normal. The limits of the color fields were normal, with the exception of the nasal side of the left eye, where blue was reduced to 20 degrees, green to 20, but red only to 35 degrees.

One month later he returned with poorer vision. The test of the right eye showed a doubtful, not very positive, reduction, with normal field and color sense. The left, however, had only $\frac{20}{40}$ V, which was not improved by glasses, and with it a dim color perception, while the field was not materially, if any, restricted. Strong adduction of the left eye was painful. He was put on salicylates temporarily, but in spite of this the sight of the left eye fell off gradually for two weeks, until only movements of the hands could be perceived. Still he kept a good field and showed no defined central scotoma. The pupil of the left eye now reacted very poorly. The ophthalmoscope showed no change, except the slight pallor of the optic nerve—not as pronounced as in the other eye.

From now on (still under K. I.) the left eye improved until in March it had regained $\frac{20}{40}$ ($\frac{20}{20}$ with correction). The pupil was again normal. He then left for the country to do farm work, continuing, however, the use of iodid. The following November he returned in a satisfactory condition, with V (uncorrected) R $\frac{20}{20}$; L $\frac{20}{40}$ —. Fundus normal. After three years of country life, I saw him again in perfect health, vision being now in either eye (uncorrected) $\frac{20}{20}$. The former correcting glass was no longer accepted. He still showed nystagmus of eyes and head on forcibly turning of the eyes. The knee jerks were normal.

In the pathologic analysis of the case, the site of the lesion is to be inferred, in the first place, from the motor symptoms, viz.: slight paresis of the orbicularis branch of the facial nerve, total abolition of abduction and adduction, with integrity of convergence, and—negatively—intact pupillary reflex and accommodation. These well-defined, isolated paralytic symptoms were most likely caused by a lesion involving the nuclei of the nerves along the floor of the aqueduct of Sylvius. In no other locality is disease likely to involve simultaneously the nerve paths for associated lateral movements of the eyes and leave intact the mechanism of convergence. In the disease termed by Wernicke "Acute Poliencephalitis Superior," it has been shown by autopsies (Wernicke, Oppenheim, and others) that isolated paralyses of some of the eye muscles, or merely of some of the associated movements of both eyes, are produced by lesions of the nuclei or of the fibres connecting them with the cortex. Of the inconstant concomitant symptoms —headache, nausea, vertigo, staggering gait, somnolence, etc.—vertigo, unsteady gait, and a "full" feeling in the head were present. The vertigo was not entirely due to the diplopia, since it did not cease on closing the eyes. While the disease ends usually in death, recoveries have been observed (Oppenheim,[1] Starr,[2] and others). In Wernicke's[3] cases and some of the others, disturbances of sight have been noted. The disease has been known to follow influenza. While the diagnosis of influenza cannot be proven definitely in our patient, there was the well-defined history of an initial "cold" in the head, during a time when mild influenza was common in Chicago. The original vertical nystagmus is consistently explained by irritation of the nerve-nuclei during the acute period. After partial recovery and permanently during the entire period of observation, a different form of nystagmus was observed. On extreme turning of the eyes, and only during this effort, an oscillation of the eyes and of the head took place in the

[1] *Lehrbuch d. Nervenkrankheiten*, 1894, p. 520.
[2] *Organic Nervous Diseases*, 1903.
[3] *Lehrbuch d. Gehirnkrankheiten*, 1881, iii., p. 229.

plane of the ocular deviation. This form of nystagmus may be compared to the "intention tremor" of disseminated sclerosis, and can be referred with plausibility to permanent, though slight, damage done to the primary centres of ocular movements. The origin of the fibrillary twitching of the lid muscles, which persisted likewise, is not clear, but this is after all a symptom of minor importance. The convergent strabismus lasted longer than the paralysis of abduction and adduction. It can be satisfactorily explained by peripheral conditions, viz.: an excess of tension of the interni muscles as compared to the external recti. This view was borne out by the esophoria persisting after the manifest convergent squint had ceased by reason of recovering innervation.

Judged by the motor symptoms alone, the case can thus be considered a circumscribed acute poliencephalitis superior, presumably started by influenza. To what extent must this diagnosis be modified in the light of the visual disturbances?

The motor paralyses were accompanied by reduced visual acuity nearly alike in both eyes, with intact fields and color sense, and without scotomata. The dimness began to improve from the first day, and not quite normal sight was regained in two months, with, however, a slight but positive improvement for about two to three months longer. But while taking large doses of iodid nearly steadily, there came on in the eighth month a dimness on the right side of both eyes. This was barely measurable by the perimeter as a slight restriction of both visual fields towards the right. With it central vision fell off a trifle in both eyes. While the right eye soon returned towards the normal, the left failed more and more. Measured by the color field, the encroachment spread from the nasal (right) side towards the centre. Within two months the left eye was nearly blind. Any suspicion I had regarding the possible hysterical origin of some of the symptoms (the reversion of the color fields) was dispelled by the imperfect pupillary action as well as by the slow but steady improvement which followed. After about six weeks the left eye was again useful and in the end (that is, in the course of more than a year) it became normal.

The dimness of the first period was not accompanied by any ophthalmoscopic anomaly. At the time of the hemianopic symptoms, both optic nerves appeared a trifle pale, but the right as much, if not more so than the left, even when the latter eye had become nearly blind. Ultimately the normal color of the papillæ returned.

I am not acquainted with any description in ophthalmic literature of transient bilateral dimness with normal fields, normal color sense, and without scotomata, unaccounted for by ophthalmoscopic findings. I have, however, personally seen this condition in at least three other instances associated with palsy of one or the other eye muscles. These were all cases of unquestionable syphilis, presumably basal lesions. The most probable lesion to account for this visual disturbance seems to me to be either a slight compression or a neuritis (or perineuritis) of the intracranial portion of the optic nerve. The existence of such lesions has been demonstrated by Uhthoff (*Arch. f. Ophthalmologie*, Bd. xxxix., p. 1) in autopsies of syphilitic subjects. In the ordinary retrobulbar neuritis, where the disease involves the optic nerve peripheral to the optic canal, there is always a characteristic scotoma, which was not demonstrable in the instances referred to or in the present case.

I hence suspected syphilis as the cause from the start, and accordingly gave iodid of potassium, but I could never prove this diagnosis. The one-sided iritis, said to have occurred previously, is insufficient evidence. The visual disturbance diminished at once after the first day, before the iodid could have had any effect. Moreover, the steady use of iodid did not prevent the subsequent more extensive disease of the optic nerves.[1]

In poliencephalitis superior, visual disturbances have been found in a large proportion, especially in the form of a neuritis, which, however, was not always visible during life. The original interference with sight, therefore, does not speak against the diagnosis of poliencephalitis.

[1] A case of ophthalmoplegia, presumably due to a poliencephalitis of syphilitic origin, has been described by Guibert (*Archives d'ophtalmologie*, September, 1894). The syphilis was only inferred, however, by the recovery under specific treatment.

We can scarcely assume, however, that five months after complete recovery from the palsy caused by poliencephalitis a renewed inflammation of the same origin should attack the optic nerves. This process, whatever its cause, began in the left tract back of the chiasm, and spread thence to the left optic nerve in front of the chiasm. Since it ended in complete recovery, the lesion must have been a transient inflammation. The cause of this inflammation is not made clear by the history.

Another possible explanation of the lesions must also be considered, viz.: diffuse or multiple cerebral sclerosis. In this disease visual disturbances of various natures sometimes without ophthalmoscopic findings are found in about one-half of all cases, often at the very beginning.[1] These disturbances may be transient and end in perfect recovery. Motor disturbances occur in about 20 per cent. These, too, are usually transient. Paralysis of associated movements without complete inactivity of any one nerve has been observed by Uhthoff and others. Nystagmus and still more the nystagmus-like movements on exertion only have been described by Charcot and most subsequent observers as characteristic of multiple sclerosis. Pupillary anomalies are infrequent. This disease is known to occur in atypical and incomplete forms. It is sometimes of slow development or may even recede to an extent that can be called a temporary arrest, if not a permanent cure. My patient, however, presented at no time sufficient symptoms, except those referable to the eyes, to base upon them the diagnosis of multiple sclerosis. Yet even if this diagnosis should ultimately prove to be the correct one and the explanation of his visual disturbances, the motor phenomena would still imply that the disease began in the form of a transient poliencephalitis superior.

[1] Comp. the exhaustive review by Uhthoff in *Graefe-Saemisch, Handbuch d. g. Augenheilkunde*, ii. ed., 1904, vol. xi., ch. xxii., p. 337.

HEREDITARY ECTOPIA LENTIS, WITH REPORTS OF CASES.

By Dr. G. GRIFFIN LEWIS, Syracuse, N. Y.,

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(*With Text-plates XII. and XIII.*)

Case 1.—On September 2, 1902, Master C. W., age ten, was brought to my office by his mother, who gave me his history as follows: Imperfect vision was first noticed at the age of four, from which time he held objects close to his eyes. He complained at times of vertigo, pain through the eyes and forehead, of seeing flashes of light, and of the oscillation of surrounding objects. I noticed that when reading he held his head slightly tilted towards the right shoulder. There was also a slight divergence but no diplopia, both eyes seeming to fix upon both distant and near objects. His vision was O. U. $\frac{1.8}{200}$, and with plus 8.50 S lenses $\frac{1.8}{100}$. An ophthalmoscopic examination showed both crystalline lenses to be dislocated upwards and inwards with about one third of their surface visible within the pupillary area. Both lenses were clear, were abnormally small, and oscillated as the eyes were turned in different directions. The anterior chambers were unusually deep and the irides trembled greatly when the eyes were moved.

Case 2.—Having no history of traumatism, and knowing the tendency of the transmission of congenital affections of the eye, I asked the mother, who was twenty-eight years of age, to let me look at her eyes, in which I found a similar condition. Her lenses were displaced downwards and inwards, about one third of their surface being visible within the pupillary area. The

vision of her right eye was $\frac{1}{200}$, and of her left $\frac{3}{200}$. A plus 13.00 S lens brought the vision of both eyes up to $\frac{1}{80}$.

On August 3, 1903, eleven months later, Mrs. W—— again called to see me, stating that several months previously she had suffered from a severe inflammation of the right eye, since which time the oscillation of objects, the flashes of light, and the colored impressions had all materially decreased.

I noticed at once that the right pupil was dilated obliquely, the pupillary reflexes were sluggish, and the iris was of a light blue color, whereas it had previously been gray like its fellow. When she moved the eye, I could plainly discern at a distance of several feet a dislocated lens floating around in the vitreous chamber. It had become cataractous and its white surface could be easily seen as it passed behind the pupil.

It is interesting to know that this same case was seen by Dr. Marlow in September, 1895, at which time she had an upward displacement of both lenses.

Case 3.—At my request, Mrs. W—— brought her other two children, aged respectively eight and two. The former had a dislocation of the right lens inwards and slightly downwards, and of the left lens inwards and slightly upwards, vision in both eyes being $\frac{1}{200}$, and with a plus 17.00 S lens it was brought up to $\frac{1}{70}$ in the right eye and $\frac{1}{50}$ in the left.

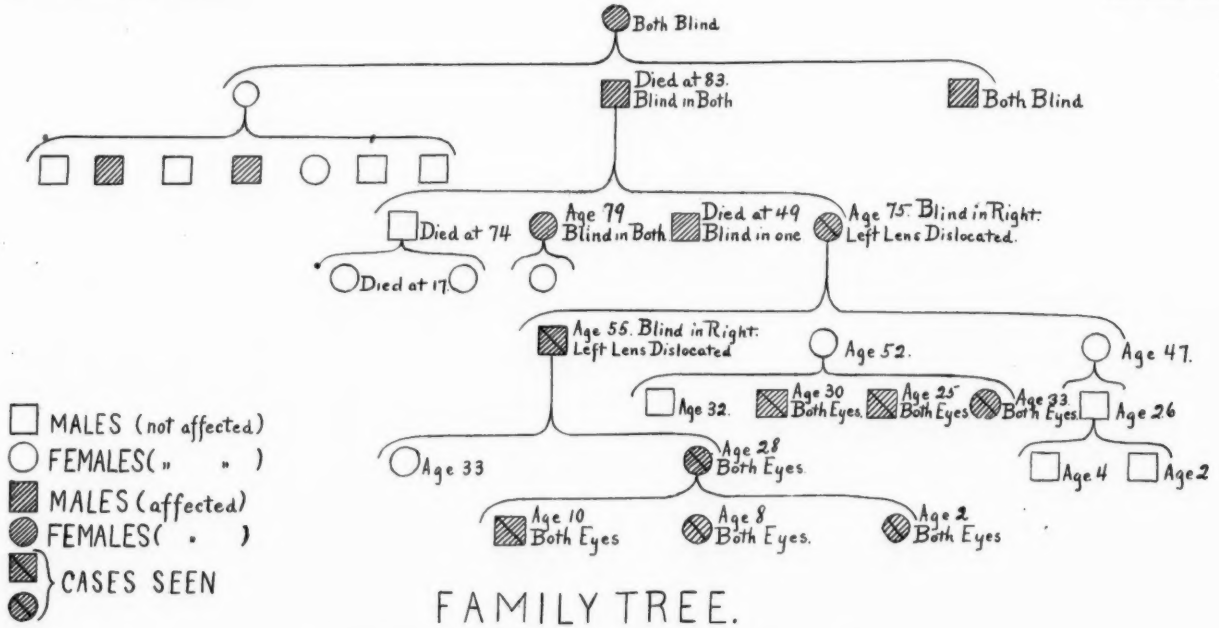
Case 4.—The younger one had a very slight dislocation of both lenses downwards and inwards.

Case 5.—Becoming somewhat curious to know how many members of the family were afflicted with this defect, I examined all who were accessible, with the following results: Mr. W——, age fifty-four, grandfather of case No. 1, had a complete dislocation of the right lens into the vitreous chamber, and the left eye was shrunken to about half its normal size, the result, in all probability, of a previous glaucomatous condition.

Case 6.—Mrs. W——, age seventy-five, mother of the latter case, had an exactly similar condition, the left eye being shrunken and the right lens completely dislocated, vision in that eye being $\frac{1}{200}$ and with a plus 10.00 S lens $\frac{1}{80}$.

Case 7.—Miss F. B., age twenty-seven, aunt of case No. 1, had a slight upward displacement of both lenses, the right only being visible when the pupil was dilated with a mydriatic.

Besides these seven cases which I have seen, Dr. Marlow has seen two other members of the same family who were simi-



FAMILY TREE.

ILLUSTRATING DR. LEWIS'S PAPER ON HEREDITARY ECTOPIA LENTIS.

larly afflicted, and I have fairly good evidence of seven more cases in the same family, making in all sixteen individuals in six successive generations.

Ectopia lentis, or congenital displacement of the crystalline lens, is not exceedingly rare, occurring, according to D'Oench,[8] about once in every five thousand eye cases; nor is it so unusual for several members of the same family to be afflicted with it, but these cases are of special interest as showing to a remarkable degree the marvellous and fateful power of hereditary influence in the transmission of this defect. According to Parker,[18] as many as twenty cases in one generation have been reported. Mules observed ten cases in one generation. Bryant reported five cases in a family of seven. Tiffany[20] reported seven cases in a family of nine, and Morton[12] reported ten cases in five generations, but, as far as I am able to ascertain, this is the first instance reported where six successive generations have been affected.

A distinction should be made between congenital and spontaneous dislocation. Lippell, who was himself afflicted with ectopia lentis, was the first one to make such a distinction, and he claimed that the congenital form was a permanent malposition and not likely to undergo changes, while the spontaneous form was due either to a trauma or to a diseased process like fluid vitreous, choroiditis, irido-cyclitis, detached retina, intraocular tumors, etc., and was liable to further degeneration. He also stated that all sideward and upward displacements were regarded as congenital, while downward displacements were regarded as spontaneous.

These rules have been pretty generally accepted, and they may be true in the majority of cases, but those just reported, among which both upward and downward, partial and complete displacements are observed in different generations of the same family, one of which formerly had an upward displacement of both lenses and now has a downward displacement of one and a total displacement of the other, prove beyond a doubt that ectopia lentis may be one of the causes of spontaneous dislocation. Stricker[17] says: "In course of time the traction on the zonula fibres above, brought about

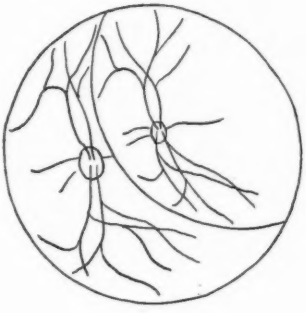
by the specific gravity of the lens, causes them to elongate, and finally the lens begins to descend, so that that which in the beginning was an upward dislocation may become a downward dislocation."

There is little doubt but that congenital displacement of the lens is due to a faulty or irregular development of its suspensory ligament (zonule of Zinn), caused by a failure or late closure of the ocular cleft in the opposite direction as the eye expands. This theory is strengthened by the fact that this defect is so often accompanied by other faults of development like coloboma iridis, coloboma lentis, microphthalmus, etc. A few cases have been reported where the development of the eye was so completely arrested that the lens never came forward to occupy its normal position but remained imbedded in the vitreous chamber.

The symptoms of *ectopia lentis* are so pronounced that it is hardly possible to make a mistake in diagnosis. The edge of the lens may be perceptible to the patient as a black stripe extending across his field of vision. He may experience flashes of light, and may have more or less pain, due to the striking of the lens against the iris when the eye is moved. If the edge of the lens presents within the pupillary area so that some of the incident rays are refracted and deflected by the lens, while others pass through the free pupillary tract, double images may be formed upon the retina, which fortunately are not always perceived by the patient, who learns to ignore the less distinct of the two. In some cases the false projection of the retinal images by the misplaced lens may produce strabismus.

Upon inspection we usually find the anterior chamber of the eye deeper than normal, the pupil dilated, and mostly somewhat oval in shape, the iris often discolored, and always tremulous at those places where it is not supported by the lens. The zonule of Zinn being torn away from the lens in places, that body, by its own elasticity, becomes thicker and smaller in circumference, and in about 25 % of the cases its nourishment is so interfered with that sooner or later it undergoes opacification. This opacification may also be somewhat hastened by the injury which the lens capsule re-

CASES DESCRIBED IN TEXT.



OPHTHALMOSCOPIC DIPLOPIA.

ceives by being constantly thrown against the iris. In some instances a few fibres of the ligament of Zinn can be clearly discernible in the aphakial interspace. By oblique illumination the edge of the lens may be seen as a grayish band running across the pupil, while with the ophthalmoscope it may appear as a dark line, and if the lens is clear a double view of the fundus may be observed, one image being seen through the lens and one beyond it.

Ectopia lentis is usually binocular and the direction of the displacement is generally symmetrical. Seldom are the lenses displaced downwards, and a number of writers claim that a downward dislocation is always a spontaneous one, sometimes developing into such from a pre-existing ectopia lentis. The most common directions of displacement are upwards, upwards and outwards, or upwards and inwards. Stricker says that a lens can never be spontaneously luxated exactly upwards. If the lens is partially dislocated, a person may have two different qualities of refraction in the same eye, the image produced by the aphakial portion of the pupil corresponding to that formed by a highly hypermetropic eye, and the image appertaining to that part of the pupil which contains the lens is that of a myopic eye. The latter condition is due to the anterior displacement of the lens and to its increased convexity brought about by a lack of tension on its periphery. Astigmatism may also be due to the fact that the lens refracts light unequally in different meridians.

The amount of improvement in vision obtained by the wearing of glasses depends upon the degree of dislocation and the amount of mobility of the lens. In many cases glasses fail to improve vision, as there may be amblyopia due the reception from birth of confused and imperfect images upon the retina. There is, of course, complete or partial loss of accommodation, according to the degree of dislocation, so that without any consideration to age both distant and close glasses will be required.

Slight ectopia lentis may pass unobserved through infancy and early childhood, not to become discovered until school life begins, when symptoms of myopia or astigmatism

appear. If the rupture of the ligament is slight, the condition may remain stationary for years, but there is a tendency for the rent in the ligament to enlarge and the displacement to increase, eventually passing into a condition of total luxation, either into the anterior or vitreous chambers.

If there is fluidity of the vitreous, which according to von Graefe is always present in these cases, a totally dislocated lens may make wide and rapid excursions in the vitreous chamber. Dr. A. R. Baker reports a case in which the lens was cataractous and hung behind the pupil with a small portion of ligament, like a door on hinges, and by jerking his head the lens would fly up and away from behind the pupil so that he could get a glimpse of objects.

Theobald [18] reports a case of a boy who had learned by bending his head forward to throw one of his lenses into position behind the pupil so that he could study his lessons and keep up with his classes in school.

The irritation of the uvea caused by the striking of the dislocated lens against it may in time set up an iridocyclitis, resulting in detachment of the retina, glaucoma, or sympathetic trouble of the other eye. A lens dislocated into the anterior chamber may press against the cornea, interfere greatly with its nutrition, and eventually produce ulceration of that membrane.

Various operations have been suggested for the relief of ectopia lentis. Several cases have been reported by Thompson [19] and others where the lenses dislocated into the anterior chamber have been replaced by manipulation through the medium of the lower lid and held in position by the use of eserine and a pressure bandage. Evacuation of aqueous sometimes causes the lens to bound back behind the iris. If the discomfort caused by the double state of the refraction is too great, iridesis may be performed, drawing the pupil directly over the lens or away from the lens, according to the degree of dislocation and the best vision obtained with a convex or concave glass. This operation does away with the second image which interferes with distinct vision, but may in some cases create sympathetic trouble in the fellow eye. Rendering the lenses opaque by needling them

will sometimes have the same result. An iridectomy may also be advisable. Extraction of the lens should never be attempted unless its presence greatly endangers the vision, and the risks of not extracting are as great as those of extracting. In order to remove the lens it is necessary to dilate the pupil, bring the lens if possible within the anterior chamber, and hold it there by myotics. Sometimes it is necessary before making the corneal incision to fix the lens by passing a needle through the cornea or sclera.

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Ref. p. 267

DETAILS OF CASES.

CASE 1.—Twenty-two; mother white; second pregnancy; one miscarriage; flat pelvis; R. O. P.; duration of labor, twenty-nine hours; high forceps, long second stage; child large and deeply asphyxiated; died in forty-five minutes; firm pressure on fundus to expel.

EYES: Contain profuse hemorrhages in all the layers of the retina, subretinal, subhyaloid, optic-nerve head and sheath, sclera; rupture of lamina vitrea.

CASE 2.—Mother, twenty-nine years, colored; sixth pregnancy; L. O. A.; duration of labor, nine hours; child lived two days. Autopsy: status lymphaticus; congestion of lungs and a cloudy swelling of kidneys and liver.

EYES: Few small diffuse hemorrhages in inner layers of retina.

CASE 3.—Mother, twenty-six years; fourth pregnancy; two still-born; L. O. A.; duration of labor, thirty-six hours; child asphyxiated, and poorly nourished; lived one and one-half hours. Autopsy: atelectasis, with œdema and congestion; cloudy swelling of liver and kidneys; subpleural and subpericardial hemorrhages; hyperplasia of Malpighian bodies.

EYES: Large and small diffuse hemorrhages in inner layers of retina, vitreous, episcleral.

CASE 4.—Mother, twenty-one; primipara; L. O. A.; labor, thirty-one hours; asphyxia neonatorum; hydramnios; lived fourteen days; green stools; infection of navel. Autopsy: purulent inflammation of the cord and peritonitis; hyperplasia of mesenteric lymph nodes and spleen; cloudy swelling of kidney and liver; atelectasis and congestion of lungs.

EYES: Large circular hemorrhages in periphery and smaller ones in equatorial region. Hemorrhages in inner layers of retina, episcleral, and sheath.

CASE 5.—Mother, twenty; second pregnancy; L. O. A.; labor, one hour; child lived eighteen days; green stools; purulent discharge from eyes; pneumonia.

EYES: Numerous hemorrhages in two inner layers of retina and in sheath of optic nerve.

CASE 6.—Mother, aged twenty-nine; third pregnancy; L. O. A.;

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27–29 West 23d Street,
New York, June 15, 1904.

To the Subscribers to the
Archives of Ophthalmology:

We regret to report that owing to an unfortunate misapprehension, the Details of Cases, the Analytical Table, and the References belonging to the article by Dr. Edward B. Coburn on *Hemorrhages in the Eye, Present at Birth*, were printed at the close of the article by Dr. G. Griffin Lewis. These will be found on pages 282–286 of the number for May, 1904.

We enclose two erratum slips which may be pasted to face pages 266 and 282.

G. P. Putnam's Sons

labor, eleven hours; narrow pubic arch; low forceps; child, deep asphyxiated; lived fifteen days; green stools; abscess of occiput. Autopsy: lobular pneumonia; purulent pericarditis; abscess right kidney; congestion and hyperplasia of spleen and mesenteric lymph nodes.

EYES: Hemorrhage in all layers of retina, subretinal, scleral, and episcleral; suprachoroid and sheath of the optic nerve.

CASE 7.—Mother, twenty-seven; primipara; slight albuminuria; R. O. A.; labor, thirty-three hours; child lived four days. Autopsy: lobular pneumonia; multiple punctate hemorrhages of pleura and pericardium.

EYES: Hemorrhages in three inner layers, subretinal, and subhyaloid.

CASE 8.—Mother, thirty-one; second pregnancy; slight albuminuria; L. O. A.; labor, fourteen hours; still-born.

EYES: Extravasations in two inner layers of retina and in sheath of optic nerve; great œdema of retina and choroid.

CASE 9.—Mother, twenty-six; multipara; labor, fifteen hours; L. O. P.; still-born.

EYES: Large; hemorrhages in two inner layers of retina, in optic-nerve head, and episcleral.

CASE 10.—Mother, twenty-one, colored; primipara; L. O. A.; duration of labor, fourteen hours; lived fifteen days; green stools. Autopsy: gastro-entero-colitis.

EYES: Hemorrhage of nerve-fibre layer of retina and subhyaloid.

CASE 11.—Mother, thirty-one, colored; seventh pregnancy; suspected syphilis; rickets; five still-born children; R. O. P.; labor, thirty-seven hours; child died suddenly on third day; congestion and atelectasis of lungs and subpleural hemorrhages.

EYES: Show a few small hemorrhages in periphery.

CASE 12.—Mother, twenty-nine; second pregnancy; justo-major pelvis; breech presentation; labor, seventeen hours; child lived twelve hours. Autopsy: atelectasis of lungs.

EYES: Intense congestion of retinal and choroidal vessels; diffuse hemorrhages in inner layers of retina, in optic-nerve head and sheath.

CASE 13.—Mother, twenty-nine; third pregnancy; L. O. P.; labor, seven hours; child lived four days. Autopsy: bronchial pneumonia.

EYES: Hemorrhages in inner layers of retina and in vitreous.

Case 14.—Mother, thirty-seven; seventh pregnancy; two miscarriages; L. O. A.; dry and premature labor, lasting eleven hours; child lived four days. Autopsy: atelectasis and congestion of lungs; cloudy swelling of kidneys and liver; punctate hemorrhages of pleura.

Eyes: Show hemorrhages in inner layers of retina.

Case 15.—Mother, twenty-two, colored; primipara; albuminuria; L. O. A.; labor, eleven hours; child lived six days. Autopsy: hemorrhages in internal organs.

Eyes.—Hemorrhages in periphery of one and generally distributed in inner layers of retina of other eye. Hemorrhages in anterior portions of iris and in angles of anterior chamber.

Case 16.—Mother, nineteen, colored; primipara; rickets; R. O. A.; premature labor, four hours; child lived four days; jaundiced; ecchymosis of skin; prematurity and hemophilia.

Eyes: Only one eye had few small hemorrhages in periphery.

Case 17.—Mother, twenty; primipara; L. O. P.; low forceps; labor, thirty-two hours; child lived sixteen days; cough. Autopsy: atelectasis; congestion and œdema of lungs; cloudy swelling of kidneys and liver.

Eyes.—Several small hemorrhages in peripheral portion of retina of one eye.

An investigation of the records reveals the following interesting facts:

1. With reference to the child.

	No hemorrhages.	Hemorrhages.
Cases	20	17
Average life	9 days	7 days
Longest life	22 days	18
Shortest life	1 still-born	1 still-born
Lived less than 12 hours	1	3
Lived 3 days and over	17	11
Lived 14 days and over	5	5
Twins	2	
Jaundiced	2	1
Large head, no moulding (19 hours labor)	1	
Large child (labor 29 hours)		1
Cord around neck	1	
Child lived (maternal pelvis deformed)	1	1 still-born; 1 hour	10 days; 12 days; 15 days
One eye only affected		2
Breech presentation	5	1 (deformed pelvis)
Vertex presentation		
Face presentation	1 (44 hours)	

In the cases with ocular hemorrhages the following presentations were noted: L. O. A., 11; L. O. P., 2; R. O. A., 2; R. O. P., 2.

2. Maternal statistics.

	No hemorrhages.	Hemorrhages.
Youngest	20	19
Oldest	37	37
Average age	26	26
Primipara	6	6
Multipara	14	11
Duration of labor, longest	56 hours	37 hours
" " " shortest	1 hour	1 hour
" " " average	16 hours	18½ hours
Over average labor	5	7
Albuminuria	5	3
Syphilis	2	1
Rickets	2	2
Deformed pelvis	2 (49 and 9 hours)	3 (11, 17, and 29 hours)
Colored	2	5
Version	6	
Forceps	1	1 high; 2 low ("worst" cases; 1, deformed pelvis)
Placenta previa	1	
Premature, dry, or induced labor	6	3
Strong pressure on fundus to expel child		1

(As breech presentations are said to cause less compression of the head, it is interesting to note that where the pelvis was deformed retinal hemorrhages were also found.)

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ETIOLOGY AND PATHOLOGY OF CORNEAL CYSTS, WITH REPORT OF A CASE.

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[From the Pathological Laboratory of the Manhattan Eye and Ear Hospital.]

(*With four figures on Text-Plates XIV. and XV.*)

IN the case which forms the basis of the present paper, both cornea and conjunctiva were cystic. Cysts resulting from lymphangiectasia in the subconjunctival tissue, although rare, are of sufficient frequency to be discussed in most treatises on conjunctival diseases (1, 2). The presence of this condition in the cornea, however, is so very uncommon that it seems proper to separate it from other features of the case as a subject for special consideration. This is not an unusual procedure in this particular class of cases, as the conjunctiva has been more or less involved in the majority of corneal cysts hitherto reported.

S. T., male, aged twenty-five, presented himself at the clinic of the Manhattan Eye and Ear Hospital to have removed what appeared to be a highly staphylomatous eye. Four years previously an extensive laceration of his left globe had terminated in phthisis bulbi. Less than one-half the cornea remained. There was bare perception of light. Close inspection of the apparent staphyloma led to the conclusion that it was not a protrusion of all the coats of the eye, but a thick-walled multilocular cyst, situated in the subconjunctival tissue and remnants of the cornea (Fig. 1). The sulci subdividing the cyst followed the cicatrices of the original injury. They also marked the division

between the conjunctival and corneal regions. The large blood-vessels which traversed its surface were confined chiefly to the conjunctival portion. After photographing the eye a hypodermic needle was passed into the cyst and half a drachm of thin, yellowish, faintly alkaline fluid—about half its contents—withdrawn. Picric acid and the centrifuge gave 5 % of albumen. The microscope showed endothelioid cells, cellular debris, fat and large fatty cells resembling Gluge's corpuscles. A small portion of the thick anterior wall was excised with forceps and scissors from the corneal portion of the cyst. A probe passed around the interior of the cyst appeared to encounter and destroy delicate septa. In this manner all the remaining fluid was evacuated, the anterior cyst wall collapsed, and the staphyloma disappeared. No communication between the interior of the eye and the cyst could be discovered. The operation had not affected the eye tension, and no additional fluid could be obtained by pressure upon the globe. Three days later the patient was seen again. There was no inflammatory reaction. The denuded area from which the piece of tissue had been excised was slightly moist. As the annoyance incident to excessive staphyloma had disappeared, the patient now declined enucleation. The case was not seen by me again, but I have no doubt that the cyst was permanently cured. Only the small piece of excised tissue remained for microscopical examination.

Pathologic Findings.— The specimen was fixed in formalin, hardened in alcohol of increasing strengths, and mounted in paraffin. The surface epithelium was scanty and stained poorly. It was probably detached from the tissue by the grasp of the toothed forceps during its removal. As corneal epithelium is soft and easily rubbed off, great care is necessary to preserve it intact in histological specimens. The microscopic sections showed a series of irregular cavities separated from each other by connective-tissue trabeculæ of varying thickness (Fig. 2). The walls of the cavities were sparsely lined with scattered endothelioid cells. Many cavities were empty or spanned by thread-like fibres; others contained granular material, colloid matter, endothelioid cells, and cellular detritus. The connective-tissue septa stained intensely with eosin; they also exhibited a curious tendency to transverse cleavage and to fracture sharply, possibly due to the methods employed in hardening and mounting (Fig. 3). Elastic tissue could not be demonstrated by Weigert's

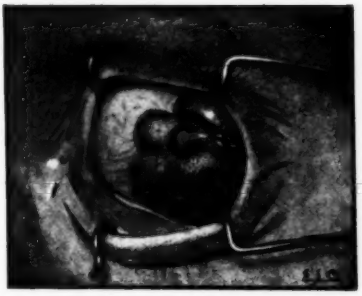

FIG. 1.—Cyst of conjunctiva and cornea. Lymphangiectasis cavernosa.

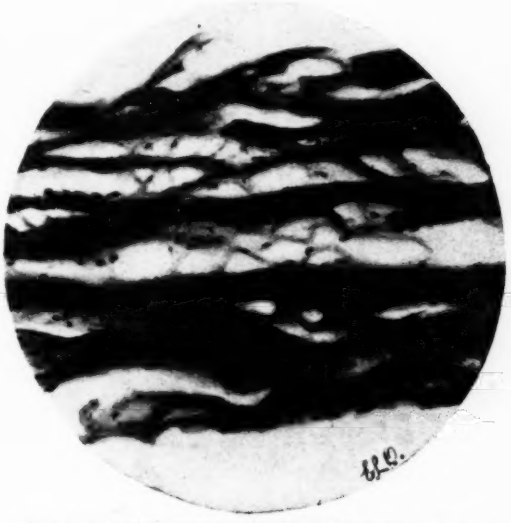

FIG. 2.—Section from lymphangiectatic cornea. × 145.

stain. The diagnosis made from the clinical and microscopic appearances was lymphangiectasis cavernosa of the conjunctiva and cornea.

In reporting cysts of the cornea, writers have designated them epithelial cysts when their inner walls were lined by epithelial cells of conjunctival or corneal origin. When their cellular lining was endothelial in character, they were supposed to have been formed in the lymph channels of the substantia propria. The microscopic appearance of the cells and their staining qualities have served to differentiate the two.[1]

Epithelial Cysts.

The following cases will illustrate the epithelial type of these tumors.

Reported by DEL TORRO (4). The patient was a man of fifty. A cyst of the cornea had existed for fourteen months. The author believed that the cyst developed from conjunctival epithelium which had overlapped the cornea.

The cyst was emptied and recovery followed in four days.

BIETTI (5). Female, aged twenty-four. No history of previous injury or severe inflammation. A cyst $3 \times 5mm$ was situated at the limbus, in the median line. Three-fifths of the cyst was in the cornea. A second smaller cyst was situated entirely in the cornea. The larger cyst was removed with a sharp knife. It was so deeply imbedded that the anterior chamber was entered during the operation. Bietti, who examined it microscopically, considered the possibility of its being a dilated lymph space lined with endothelium, but the reaction of the cells to Van Geisen's stain decided him in favor of its epithelial origin. Its development was supposed to have been preceded by a keratitis marginalis superficialis.

REID (5). The report of this case is incorporated in Bietti's paper. The patient had orbital tumor with exophthalmus. There was a corneal cyst at the limbus, lined by flattened epithelium, and covered externally by conjunctival epithelium.

[1] Here and elsewhere we adhere to KÖLLIKER'S (3) views regarding the non-identity of epithelium and endothelium. In the latest edition of his book, endothelium is still regarded as a connective-tissue product. Pathologists will be loth to abandon terms so convenient for differential descriptive purposes.

The illustrations of this case show that the cyst was formed entirely in the epithelial layers. They remind us of the vesicular spaces seen in glaucoma, or the vacuoles described by FRIDENBERG (6) as occurring in the corneal epithelium of degenerated eyes. Reid ascribes its origin to an overlapping of the conjunctiva.

SCHIECK (7). A young man, aged twenty, had gonorrheal ophthalmia, with perforation of the cornea and double prolapse of the iris. The chemotic conjunctiva, which covered two-thirds of the cornea, was deeply scarified. When seen one year later he had three large cysts covering the cornea. The eye was enucleated and examined microscopically. The cysts were lined by flattened epithelium. They did not communicate with the interior of the eye.

Schieck explains their development by supposing that when the ophthalmia subsided, the border of the overlapping conjunctiva adhered to the cornea, forming a closed cavity in which fluid formed. The agglutination was caused by healing of the deep scarifications which had passed through the conjunctiva into the cornea.

SAMELSOHN (8). Over the prolongation of the external rectus was a cyst *3mm* in diameter, extending over the cornea for a distance of *1mm*. Excision of its anterior wall showed that it was deeply imbedded in the substance of the cornea. It was supposed to have resulted from degeneration in the apex of a pterygium. The cyst was drained and in three days cure was complete.[1]

COLBURN (10). Boy, aged fifteen; in early childhood he was bitten in the eye by a dog. The scar was still visible at the limbus. A cyst appeared between the cornea and inner canthus. It grew rapidly, extending into the cornea, which remained transparent. When the cyst was opened a clear fluid escaped. Its anterior and posterior walls were of corneal tissue. Recovery was rapid and complete. As no microscopical examination was made, this case cannot be accurately classified, but its history suggests a conjunctival origin.

RUMSCHEWITSCH (13). Female, aged twenty-four; this case is reported as a congenital cyst of the conjunctiva. As it also

[1] This case is cited by LA GRANGE (9) as an example of a true corneal cyst, but he makes the mistake of attributing its authorship to Just.

FIG. 3.—Wall of corneal cyst. Dilated lymph spaces lined with endothelioid cells. × 420.

FIG. 4.—Section of ectatic cornea. Lamellæ atrophic. Dilated lymph spaces contain newly formed endothelioid cells. × 285.

(Photomicrographs by the author.)

covered the atrophic cornea it deserves to be mentioned here. Its genesis, as formulated by the author, was antenatal ulceration of the cornea; incarceration of the iris in a soft cicatrix through which aqueous was forced into the tissues by intraocular pressure. He considers the most frequent cause of all bulbar cysts is the preliminary entrance of aqueous beneath the conjunctiva.

While it is true that most cases are preceded by violence or ulceration, if the exciting cause were the presence of aqueous beneath the conjunctiva, cysts should be more common than they now are.

A case reported by COLWELL (12) does not appear to have been a true cyst, but rather a vesicular eruption on the cornea. The patient had vesicles upon the hands and wrists.

FUCHS (14) says pterygial cysts may develop in any cavity of the membrane that is lined with epithelium, either glands, crypts, or folds in the tissues. He calls them *retention cysts.*

It will be observed that in all the cysts so far described the epithelium of the conjunctiva was in some manner responsible for their existence. In their early stages they were probably superficial. Their subsequent extension into the substantia propria may be attributed to displacement or absorption of the surrounding tissue from pressure incident to their growth.

According to TREACHER COLLINS (11) cysts may result from detachment and implantation of corneal epithelium in the substantia propria. He describes two such cases.

CASE 1.—A gun-shot wound of the eye had resulted in atrophy. The cornea was small and cicatricial. It contained several groups of epithelial cells, *some of which were continuous with the surface epithelium*, others isolated. The larger groups were cystic and contained a hyaline substance.

CASE 2.—The eye was degenerated as a result of cataract extraction. The cornea was very small. In its centre was a large cyst lined with superimposed layers of epithelial cells. The cyst was separated from the surface epithelium. The author concludes that the cysts developed from corneal epithelium, implanted by the shot in the first, and by the knife in the second case.

This implantation theory contains nothing impossible or improbable, and has been endorsed by SUTTON (27), GREEF (28), and others. I doubt, however, that it truly explains the genesis of these cysts. In the well-known process of repair following a corneal wound, an active proliferation of the surface epithelium immediately ensues, which in from twelve to twenty-four hours completely lines the wound and plugs the opening. When regeneration pursues a normal course, the cornea reunites from within outwards, gradually forcing the epithelial plug to the surface. Occasionally the external opening of the wound unites before deep union is complete. When this occurs it necessarily separates the epithelium in the depths of the wound from its connection with the surface cells, leaving isolated epithelial masses in the corneal tissue. These epithelial masses may perish, or proliferate and form cysts. This view is founded on cases which I have examined microscopically and intend to report later.

ALT (15), while making a microscopical examination of an eye, found epithelium on the sclera and cornea beneath a pterygium, which, he assumes, might metamorphose and form a colloid cyst.

Lymphatic Cysts.

The lymphatic or endothelial cysts, of which the case I have here reported is an example, are formed in the substantia propria from dilatation of the corneal canals and lacunæ. Through atrophy and rupture of the lamellæ a large cavity ultimately forms. The microscopic picture is similar to lymphangiectasia of the subconjunctiva. The following cases belong to this class.

GINSBERG (16). This author examined a newly hatched chick with a corneal cyst in each eye. The cysts were typical lymphangiectases. Ginsberg ascribed their development to lymphatic obstruction and dilatation of the corneal canals, with consequent compression and atrophy of the corneal tissue. He says truly, the cause of lymphatic obstruction and stasis cannot always be discovered.

WINTERSTEINER (17). Two corneal cysts were present in an eye that had been enucleated for glioma of the retina. The cornea was ectatic and invaded by glioma cells. The two cysts

were separated from each other by a thin corneal lamella, but connected by a narrow passage. Both cavities were lined by imperfectly formed endothelium, and filled with a finely granular material. The author regarded the cysts as dilated lymph spaces, due to stasis. He is uncertain how the stasis was brought about, but offers the following suggestions: obstruction of the lymph channels by tumor elements; stenosis of the efferent channels from continued high pressure behind the cornea; corneal œdema from glaucoma, with rupture of the corneal lamellæ and fusion of spaces.

WECKER (18) describes a cyst near the corneal margin, of four years' standing, which developed over a "light spot" that had existed since childhood. Only the anterior wall of the cyst was examined. As this was not lined by epithelium, we assume that it was a dilated lymph space.

CZERMAK (19) has observed that, when a long-standing corneal fistula closes, a small vesicle or cyst frequently forms in the cicatrix. Czermak does not believe that this results from leaking of aqueous, but that a defective spot in the cicatrix produces a space in which corneal fluid accumulates. He regrets that the term "cystoid cicatrix" has been pre-empted, as it describes this condition accurately.

SACHS (20). Strictly speaking, this is not a case of lymphangiectasia of the cornea, but it suggests how one may originate. A female, aged fifty-five, had a cyst, *3mm* in diameter, at the inner corneal margin on the site of a pterygium. It was examined microscopically, and found covered externally with conjunctival epithelium. Its internal structure showed that it had developed from a dilated lymph vessel.

Miscellaneous Cysts.

ALT (21) examined microscopically four cases of corneal cysts situated in the substantia propria. All had been preceded by a perforation of the cornea. Two were lined by pigment and contained a clear fluid, one had smooth walls, and one contained a reticulum. The pigmented cysts were supposed to have developed from fragments of uveal tissue implanted in a corneal wound. By their subsequent growth the surrounding lamellæ were destroyed and the cystic cavities formed. The author says the two unpigmented cysts may have originated from iris plugs which became separated and included in the cornea. The retic-

ulated cyst reminded him of an old abscess cavity whose contents had been absorbed.

WÜRDEMAN (22) reported an echinococcus cyst of the cornea.

COLBURN (10) quotes a case where a cyst formed around a piece of steel embedded in the cornea.

An epithelial cystoma (30), the dermo-epithelioma of PARINAUD (23), may extend from the conjunctiva to the cornea.

The large corneal spaces of advanced glaucoma rarely attain sufficient size to be recognized clinically as cysts. They are believed to result from stasis produced by increased intraocular pressure mechanically compressing the efferent channels of the cornea. FUCHS (31).

From a study of these cases, it is evident that no single etiological factor can be considered as the cause of lymphatic cysts in the cornea. It is more reasonable to suppose that dilatation of the lymph spaces may be produced in various ways, and that each case must be explained from an analysis of the peculiar conditions under which it has developed. LA GRANGE (9) says of corneal cysts in general: "It is possible that their pathology is connected with myxomatous degeneration." He further states: "Liquid collections may form in the cornea by the same mechanism as in congenital cysts." La Grange does not state his views on the formation of congenital cysts. We assume, however, that he adopts the theory of an imperfect closure of the fœtal cleft.

MAGNI (24) says that endothelium-lined cysts, close to the pericorneal ring, may arise from the lymphatics.

The theory that they may be due to absorption of aqueous through a leucoma adherens, or to the previous entrance of aqueous beneath the conjunctiva, would naturally lead us to expect their more frequent occurrence. Furthermore, ULRICH (25) has demonstrated that scar tissue, resulting from loss of Descemet's membrane, is less capable of absorbing or transmitting aqueous than the normal cornea.

The obstruction offered by a cicatrix to the corneal circulation may be a causative factor, but it is improbable that this alone is sufficient to produce a cyst. Although it is conceivable that a cyst may originate from stasis and dilata-

tion of the lymph spaces, it can occur only under the most extraordinary conditions. The anatomical obstacles to such a formation in the cornea are as follows: the dense, unyielding connective-tissue structure of the substantia propria; the free communication existing between the interlamellar canals; the extensive system of efferent channels encircling the cornea; and the intraocular pressure. The tendency of the last factor is to approximate the lamellæ, and coincidently diminish the area of the spaces.

In the case of my patient, all the above conditions were greatly modified. The cornea was partially destroyed and occupied by cicatrices. It was encircled by lymphangiectasia of the conjunctiva; the delicate system of pericorneal capillaries, which supply nutritive lymph, was undoubtedly destroyed, and the intraocular pressure was greatly diminished. Under these circumstances, a lymphangiectatic process already existing in the subconjunctival lymph spaces would find little to oppose its extension into the corneal tissue.

I wish to call special attention to one of these etiological factors which has not hitherto been suggested as influencing the formation of corneal cysts, namely, the effects resulting from pathological changes in the system of episcleral capillary loops which encircle the cornea and furnish the "lymph" by which it is principally nourished. In degenerated, and especially ectatic, corneæ we occasionally find dilated lymph spaces containing endothelial cells, cellular debris, etc. Such spaces are usually associated with the presence of adventitious blood-vessels around the limbus, which have presumably supplanted the physiological capillary system. Assuming that the pericorneal capillaries furnish a specialized fluid designed for corneal nutrition, it is evident that serious alterations in their structure would entail corresponding changes in the character of their secretion, and in place of a bland nutritive juice, a vitiated, irritating fluid, ill fitted to circulate in the substance of the cornea, would be produced. Under such circumstances, the cornea would be insufficiently nourished, with atrophy of the lamellæ and dilatation of the lymph spaces as a natural

sequence. The presence of endothelioid cells in the spaces may be attributed to the stimulating action of such an irritating fluid on the naked connective-tissue walls of the spaces, producing a cellular proliferation. ZIEGLER (29) says: "*Cysts lined with endothelium may originate from newly developed lymph spaces and ducts.*" The italics are his.

Fig. 4 is from a photograph showing a section of cornea that well illustrates such dilated lymph spaces; the cornea was staphylomatous, with a central leucoma adherens. The diameter of the leucoma was *2mm*, that of the synechia *1mm*. The periphery of the cornea was vascular. The photograph represents a region distant from the leucoma. It shows the lamellæ shrunken, with a corresponding dilatation of the lymph channels. One large space is seen filled with well-developed endothelial cells. Other spaces contain fewer cells, less perfectly developed.[1] It is easy to understand why a cornea so weakened yielded to normal intraocular pressure and became staphylomatous. If, on the other hand, the intraocular pressure were greatly diminished, thus withdrawing support from the cornea, and the atrophy progressed, would not such spaces still further dilate and a cystic condition result?

These atrophic lamellæ and dilated spaces containing endothelioid cells, are to be regarded as incipient lymphangiectases. It is difficult to accept the theory that they, or the cysts, result from obstruction to the lymph currents and stasis. We are unable to understand how so extensive an efferent system as the corneal can be generally obstructed, and no microscopic evidence of the fact exist.[2] The cause of lamellar atrophy cannot at present be accurately demonstrated, but our observations have led to the conclusion that it may result from malnutrition, incident to changes in the composition of the corneal lymph.

The treatment of a corneal cyst appears to be simple and

[1] Shrinking of the lamellæ frequently results from the process employed in preparing eyes for histological examination. This condition is easily distinguished from a pathological process. Normal corneal spaces, except in the case of certain embryo mammals (26), do not contain an endothelial lining or cellular debris.

[2] Glaucoma interferes with the corneal circulation, also with corneal nutrition. Glaucomatous conditions are not discussed here.

satisfactory. Excising a piece of its wall establishes drainage, and the cavity is abolished by agglutination of its surfaces.

RÉSUMÉ.

The two principal forms of corneal cysts are the epithelial and lymphatic.

The most frequent is the *epithelial*, so-called because its cavity is lined with epithelial cells. It usually originates from the epithelial layer of the conjunctiva engrafted upon the cornea. Epithelial cysts, attributed to implantation of corneal epithelium and fragments of uveal tissue, have been reported.

Exception is taken to the view that cysts develop from surface epithelium accidentally detached and implanted in corneal wounds. When cysts follow perforating wounds, the sequence of events is believed to be as follows: (*a*) In healthy corneal wounds the surface epithelium rapidly proliferates, lining the wound with epithelial cells. (*b*) Instead of uniting from the bottom outwards, the wound may first close superficially, thereby isolating the epithelium which has extended into the depths of the wound. (*c*) The epithelial mass, thus separated from all connection with the surface cells, may, under favorable conditions, proliferate and form a cyst.

The *lymphatic* cysts result from dilatation and fusion of the corneal canals and lacunæ. They are lined with endothelioid elements. The prevailing view is that they are caused by an obstruction of the lymph currents, producing stasis and distension of the canals, the consequent compression causing the lamellæ to shrink and disappear, thus producing a large cavity. This view is not accepted here, and the following conclusions are advanced: (*a*) The structure of the cornea is sufficiently dense to prevent any great distension of its lymph spaces from obstruction. (*b*) The extensive efferent system of the corneal lymph spaces provide against any local obstruction. (*c*) Atrophy of the lamellæ always precedes cystic dilatation of the spaces. (*d*) The atrophy may be ascribed to pathological changes in the pericorneal capillary system, whereby a vitiated lymph

is produced for corneal nutrition. The result is malnutrition, atrophy of the lamellæ, and a corresponding increase in the area of the spaces. (*e*) The irritation of the altered lymph on the naked connective tissue of the lamellæ probably produces a proliferation of endothelioid cells. These changes are seldom extensive enough to result in cyst formation. They more frequently appear in degenerated and ectatic corneæ as dilated lymph channels lined with endothelioid cells.

Corneal cysts are readily cured by excising a piece of their walls.

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HYSTERICAL IRIDOPLEGIA AND CYCLOPLEGIA WITH REPORT OF A CASE.[1]

By MORTIMER FRANK, M.D., B.Sc. (Mass. Inst. Tech.), Chicago, Ill.

(*With two figures on Text-Plate XVI.*)

NO ocular symptoms of nervous origin so closely resemble organic lesions of the nerve centres and present such a great variety of forms as those due to hysteria. The difficulty that presents itself in these cases is, how to disassociate the symptoms in a given case from those involved in an organic lesion, since both have features in common. The perfect simulation of a group of symptoms, such as mydriasis, unilateral amaurosis, abolition of light and accommodative reflexes, that usually belong to organic nuclear disease, can be differentiated from it only by the improvement or recovery of the ocular symptoms at the time when the other phenomena of hysteria disappear. That hysterical paralysis of accommodation is uncommon, and mydriasis not frequent, is shown by the few cases reported. Aurand and Fraenkel (*Revue de Médicine*, October 10, 1896) published a case of this character, while in Donath's case (*Neurol. Centr.*, 1892) the iridoplegia and cycloplegia were periodical.

April 18, 1903, Mrs. M. M——, age thirty-two years, complained of not seeing well at times with her left eye for the past two years and of pain at back of the head. She is of a nervous and excitable temperament, but not an extreme example of that

[1] Reported in brief before the Chicago Neurological Society, December 3, 1903.

state. Her family history is negative, and she has never had any serious illness. Attention was first directed to an inequality of the pupils, the left being larger, measuring 5*mm*, while the right measured scarcely 3*mm*. The patient had noticed the difference since July, 1902, but remarked that she was aware of it only when she was nervous and excited, and then her vision was poor, especially for objects within the reading distance. Pupillary reflex of the left eye to light abolished when stimulated directly or consensually; likewise the ciliary reflex; those of the right eye were normal. On the same side of the neck as the dilated pupil a spasmodic contraction of the left half of the trapezius muscle was observed, which, however, disappeared, as well as the pain at the back of the head, while the patient was removing her waist for further examination. No difference in the pupil could be discerned. In about thirty minutes the contraction had returned. Knee and elbow reflexes were found normal. Sensitive hyperæsthetic areas were demonstrated over the left mammary and hypochondriac regions.

A visual field of the left eye was taken with the following result (Fig. 1).: The field for white is slightly contracted; that for red is narrowed, but larger than the blue field. The color field for blue is greatly constricted and transposed with both the red and the green. The green field overlaps the blue in places and is markedly contracted. Examination showed no scotomata or fragments of such. After finishing the examination, another field of the left eye was taken, which presented still more contraction and transposition, as is often seen in these cases, indicating further evidences of anæsthesia of the perceptive elements of the retina. O. D. V., $\frac{6}{6}$; O. S. V., $\frac{6}{6}$. With the right eye Snellen reading type 0.5 D was read at 13*cm*, but with the left eye only 4.5 D was read. By placing before the left eye a + 3.00 D sphere, she was enabled to read 0.5 D at 13*cm*, permitting an amplitude of accommodation of only 5 D. Under homatropine and cocaine the following correction was obtained with the retinoscope and confirmed subjectively: O. D. V. $\frac{6}{24}$, + 1.25 ⊃ + 0.25 C 90°, $\frac{6}{6}$; O. S. V. $\frac{6}{6}$, + 0.25, $\frac{6}{6}$.

A reduction of + 0.50 sphere was made in the right eye and correction given for constant wear. One week later the patient returned and the vision in the left eye had not been improved by her correction. The visual field was again taken and showed an entirely different picture from the one taken at the first exami-

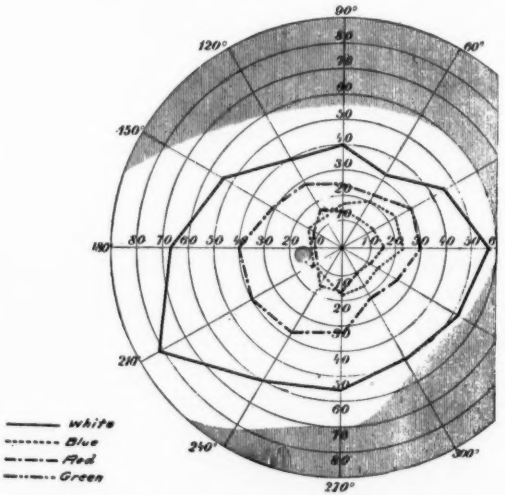

FIG. 1.—Visual field of left eye, taken April 18, 1903, showing concentric contraction and transposition of blue and red, also green and blue. The test objects were white and colored discs, and one cm square.

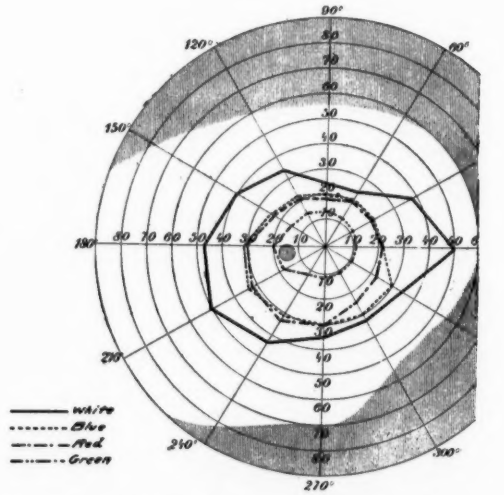

FIG. 2.—Visual field of left eye, taken one week later, April 25, 1903, showing greater contraction and only partial transposition of blue and red about the 240th meridian.

nation. The field for white was contracted (Fig. 2) more than at the first examination, and the blue field now overlapped the red except in one meridian. The visual field for the right eye now showed the same characteristics. For several months the patient was under treatment with the time-honored remedies, but with no results. During the summer she was away from the city, and when she returned all the symptoms described had disappeared. She is now (December, 1903) enjoying the best of health.

My conclusions that the case was functional and not organic are based upon the following:

(1) The character of the loss of vision could not be explained by any lesion of the central nervous system.

(2) Absence of ophthalmoscopic findings.

(3) The typical hysterical visual field.

(4) Hyperæsthetic areas.

(5) The after-history of the case did not correspond to the course of any known organic disease.

REPORT OF A NEW METHOD FOR THE APPLICATION OF LOCAL ANÆSTHESIA IN OPERATIONS ON THE EYEBALL AND EYELIDS, ESPECIALLY IN TRACHOMA.[1]

By J. GUTTMAN, New York.

THE greatest achievements in medicine within the last century were, undoubtedly, the introduction of antisepsis and narcosis in surgery. Although narcosis must be considered one of the greatest boons to mankind, still we must acknowledge that it is accompanied by a certain amount of danger to life; this fact is well known and considered by the surgeon, but not so by the layman, who will attempt, very often, to persuade and induce the surgeon to employ a general anæsthetic, when it is not absolutely indicated, in order to avoid the least possible pain.

The latest statistics show that 1 death occurred in 3258 cases of chloroform and 1 death in 14,987 ether narcoses, so that, although general anæsthesia with chloroform was a blessing to 3258 patients, to the 3259th patient it meant death. If we are able to save this one patient, by eliminating this small risk, which, to the person concerned, means practically everything, by substituting the general anæsthetic by a safer method, it is our duty to do so.

The first step in this direction was taken by Koller, who in 1884 introduced local anæsthesia in ophthalmic surgery, by the instillation of cocaine into the conjunctival sac. Local anæsthesia by cocaine, obtaining a strong foothold in ophthalmic surgery, soon superseded general anæsthesia in

[1] Read before the Ophthalmological Section of the New York Academy of Medicine, February 15, 1904.

other branches, especially in minor surgery, but here the use of cocaine necessitated different methods of application.

Shortly after Koller advocated the use of cocaine in ophthalmic surgery, Halsted and Hall in 1886 showed that the injection of a normal salt solution rendered the skin anæsthetic; a year later, Reclus showed that this could be more easily accomplished with a 1 % solution of cocaine; three years later, in 1889, Schleich adopted the same method, but went a step farther, by showing that minute quantities of cocaine were sufficient to produce local anæsthesia, and it was through his untiring efforts that the general surgeons began to appreciate the value of this form of local anæsthesia.

In 1885, Oberst introduced the regional paraneural infiltration method, consisting in infiltrating the tissues about the peripheral nerves supplying the parts to be operated upon.

Cushing recommended the regional intraneural method of local anæsthesia, which consists in injecting the exposed nerve trunk with ½–1 % cocaine solution.

At about the same time (1885), Corning, and later Bier, introduced spinal anæsthesia, where local anæsthesia is produced by the injection of cocaine into the subarachnoidal space in the lumbar region.

As seen above, several methods, or rather variations of methods, of local anæsthesia were experimented with in general surgery to substitute general anæsthesia, but not so in ophthalmology. Here the original method of instillation of cocaine into the conjunctival sac is still in vogue, and where this is insufficient a general anæsthetic is resorted to.

As far as I could learn from the literature, no one had ever employed, or even attempted, in ophthalmic surgery the method which I am about to describe. I found an article dealing with cocaine by Fuchs, in 1902, where the author states that the infiltration method employed in general surgery is not to be recommended in ophthalmic surgery. De Schweinitz and Terrien, in their text-books of 1903, in commenting upon that method, speak rather favorably of it, but nobody seemed to have tried it.

In describing my method of local anæsthesia, I will follow the procedure that I practised in operations on the eyelids for follicular trachoma. In other operations on the eyebulb and lids I employed the same method, but with some slight modifications. The method is as follows:

The patient is put on the operating table, and one or two drops of a 4 % solution of cocaine or 1 % holocain is instilled within about three minutes into the conjunctival sac. The skin of the lids, especially the eyelashes, is washed with soap and water. I now fill a Pravaz syringe holding 25–30 minims with the following solution: Natr. chlorid., 0.2; cocaine, 0.05 (for very sensitive patients, 0.1); aqua destillat., 100; a fine No. 27 needle one-half inch long is screwed on to the syringe. Great care must be taken that the syringe does not leak, and that it does not contain any air bubbles.

I first begin to anæsthetize the upper lid of the left eye, by standing at the patient's left side, and turning the upper lid; the conjunctiva being here closely attached to the cartilage, there is no subconjunctival tissue that could be infiltrated, and this probably is one of the reasons that Fuchs and others failed in their experiments to anæsthetize the upper lid by infiltration. In order to avoid this obstacle, I turn the cartilage of the upper lid with a roller forceps, which I hold in my left hand, so that the part of the conjunctiva (retrotarsal fold) which lies above the cartilage and which contains loose connective tissue is turned toward me. I now take the syringe at its lower end with my right hand, and introduce, very carefully, the point of the needle, near the upper margin of the cartilage, in an oblique almost horizontal direction as superficially as possible, and only deep enough for the opening of the needle to be covered. If this step is done with great care the patient will experience no pain. This is very important in children, because, if the little patient has any pain at this stage, before the first wheal is formed, it immediately becomes alarmed and will cry during the entire operation.

After the introduction of the needle, an assistant pushes the piston of the syringe, and as soon as four or five drops of the solution are injected, a grayish-white wheal is formed;

now I draw the needle out of the conjunctiva, and can dispense with the forceps that I had used before for turning the lid, because this first wheal will keep the lid everted. This little white wheal being the first anæsthetic area, I can now proceed more boldly. I grasp the syringe at its upper end with my thumb on the piston and introduce the point of the needle within the border of the first wheal and inject again a few drops of the contents of the syringe, thus raising another part of the conjunctiva and rendering it anæsthetic; I now draw the needle out again and inject within the border of the second wheal another few drops of the solution until the entire conjunctiva is raised and infiltrated. Fifteen to twenty-five drops are, as a rule, sufficient to infiltrate the entire conjunctiva of one lid. The conjunctiva thus infiltrated and anæsthetized, the trachoma granules become prominent and plainly visible, more so by daylight than by artificial light, and can be attacked with the rolling forceps more thoroughly and more systematically than in the operation as it is being practised at the present time, when the whole conjunctiva is stretched and lacerated. After some experience, the operator may dispense with the assistant, as the careful introduction of the point of the needle and the pushing of the piston can be done with the same hand.

At the turning of the upper lid in most cases of trachoma, there is to be seen a little swelling of the conjunctiva at the inner or outer angle of the cartilage. The injection and formation of the first wheal may be begun right there; the lid turns by itself, and eversion with the forceps becomes unnecessary.

The lower lid is rendered anæsthetic in the same manner, and inasmuch as turning of the cartilage here is unnecessary, the process is much simpler. In anæsthetizing the lids of the right eye, I stand at the head of the patient so that I can use my right hand to better advantage.

I employed this method of anæsthesia in fifty-two consecutive operations for trachoma. The ages of the patients ranged from one year upwards. In none of the cases could the operation have been performed as painlessly as with the method described above; in fact, in a majority of the cases

the operation could not have been performed under local anæsthesia at all, and a general anæsthetic would have been necessary.

In operating on the eyebulb for squint, etc., the solution is to be injected into the bulbar conjunctiva; a few drops only are usually sufficient, because if a larger amount of the solution is injected the resulting œdema obscures the field of operation.

In operations on the external surface of the lids, as for tumors, chalazions, entropium, ectropium, ptosis, etc., it is not sufficient to infiltrate the outer skin alone, but the conjunctiva must also be infiltrated. At the present, I am as yet unable to give a proper explanation for this fact, as my experience in producing anæsthesia in these cases is still limited. In order that the œdema may not mask the field of operation too much, the surgeon should exercise due care not to inject more solution than is absolutely indicated for the anæsthesia. With increased experience, the proper judgment in this respect will also improve. At times it may be necessary to mark out the field of operation with pencil.

This (above described) method of anæsthesia was employed by me lately in the above-mentioned fifty-two cases of trachoma, in three operations for tumor of the upper lid, in two for tumor of the lower lid, in two cases for opening an abscess of an acute dacryocystitis, in one case of entropium and trichiasis, and in two cases of strabismus.

The following notes on the cases were taken from my records:

1. S. S., twelve-year-old boy. Marked follicular trachoma. Operated March 18, 1903. Instillation of 4 % cocaine. Subconjunctival infiltration with normal solution.[1] Slight pain experienced during operation.

2. S. W., eight-year-old boy, was sent home from school on account of follicular trachoma. Operated March 20, 1903. Instillation of cocaine and infiltration with normal solution.[1] Some crying for fear of operation rather than for pain.

[1] Normal solution: = natr. chlorid. 0.2, cocaine 0.1, aqua dest. 100.0. Weaker normal solution: = natr. chlorid. 0.2, cocaine 0.5, aqua dest. 100.0.

3. S. W., fourteen-year-old boy. Very marked follicular trachoma. Left lower lid: Instillation of 3 drops 1 % holocain and 2 drops adrenalin; subconjunctival infiltration with 0.6 NaCl solution; great pain experienced during operation. Left upper lid: Instillation same as in lower lid, but subconjunctival infiltration was made with normal solution instead of NaCl solution; absolutely no pain. Right lower lid: Instillation with 3 drops of 4 % cocaine and 2 drops adrenalin; no subconjunctival infiltration; great pain during operation. Right upper lid: Instillation of cocaine and adrenalin; infiltration with normal solution; no pain whatever.

4. J. K., nine-year-old boy. Follicular trachoma. Operation, March 23, 1903. Left eye: Instilled two drops 4 % cocaine and 2 drops adrenalin; subconjunctival infiltration with normal solution; absolutely no pain. Right lower lid: Instillation with same solution as in left eye, but instead of normal solution 0.6 % salt solution was used. The boy cried out loud on account of pain. Upper lid; Normal solution for infiltration; no pain whatever.

5. B. S., nine-year-old boy. Follicular trachoma. Operated, March 25, 1903. Instillation of holocain; subconjunctival infiltration with normal solution; some pain experienced, especially at the introduction of the needle.

6. R. G., twelve-year-old girl, sent home from school on account of follicular trachoma. Operated, March 25, 1903. Instillation with holocain; infiltration with normal solution; no pain.

7. A. M., twenty-seven years old. Acute exacerbation of an old chronic trachoma. Operated, March 27, 1903. Holocain; normal solution; no pain.

8. B. A., twenty-five years old, male. Acute exacerbation of an old chronic trachoma. Operation, March 29, 1903. Holocain; normal solution; no pain.

9. J. G., eight-year-old boy. Follicular trachoma. Operation, April 3, 1903. Holocain and normal solution. The patient was frightened and complained of pain, especially at the introduction of the needle,

10. M. H., eight-year-old boy. Follicular trachoma. Operated on April 17, 1903. Holocain, adrenalin; infiltration with normal solution; great fright at the instillation; seemingly a good deal of bleeding, but it was only the escape of the injected fluid. The boy cried a good deal during the operation.

11. L. D., eight-year-old girl. Follicular trachoma. Operation, April 17, 1903. Cocaine and holocain instillation. The patient gave a loud outcry. The combination of these solutions formed a precipitate which caused irritation. Infiltration with normal solution; no pain.

12. B. A., eleven-year-old boy. Follicular trachoma. Operated, April 17, 1903. Cocaine and normal solution; no pain. Patient cried after the operation because he could not see.

Cases 13 to 52 inclusive omitted, being like the preceding.

53. H. S., twenty-five-year-old woman. Two fibrous tumors of lower lid. Operation, May 20, 1903. Cocaine infiltration with normal solution. The tumors were enucleated from the conjunctival side. Some pain experienced.

54. R. C., fifty-two-year-old man. Chronic dacryocystitis. Operation, May 21, 1903. Extirpation of lachrymal sac. No pain.

55. E. L., thirty-year-old man. Tumor of upper lid. Operation, September 28, 1903. Outer surface of the lid was infiltrated with normal solution. The tumor was enucleated by cutting the outer skin. Considerable pain.

56. E. F., thirty-five-year-old woman. Acute dacryocystitis. Operated on May 24, 1903. Infiltration with normal solution. No pain whatever on incising the abscess.

57. R. C., fifty-two-year-old man, suffering from an old fistula, of specific origin, near the inner canthus, and leading into the nose. Operated November 24, 1903. The fistula was closed under infiltration with normal solution. No pain.

58. T. L., seventeen-year-old girl. Strabismus convergens. Tenotomy of rectus internus was done on November 25, 1903, under cocaine and infiltration of the bulbar conjunctiva with normal solution. No pain.

59. M. B., forty-one-year-old man. Fibrous tumor of upper lid. Slightly inflamed. Operated on January 7, 1904. Cocaine instillation. Infiltration of conjunctiva and outer surface of the lid with normal solution. Absolutely no pain.

60. S. L., six-year-old boy. Strabismus convergens. Operated February 5, 1904. Tenotomy of rectus internus of right eye. Cocaine and normal solution. No pain.

61. L. K., twenty-eight-year-old man. Fibrous tumor of upper lid. Operated February 8, 1904. Cocaine instillation and infiltration of conjunctiva and outer surface of lid with normal solution. No pain.

62. L. G., forty-five-year-old woman. Acute dacryocystitis. Operation, February 8, 1904. Infiltration with normal solution. No pain.

63. L. N., forty-year-old man. Entropium and trichiasis. Infiltrated conjunctiva and outer skin. Cocaine and normal solution. Operated February 9, 1904. No pain.

As seen by the above records, fifty-two cases were operated upon for follicular trachoma by squeezing out the granules with Knapp's roller forceps. The majority of these patients were children that belong positively to the least disciplined and restrained children to be found; they were not selected, but consecutive cases as they appeared for treatment at my office or out-door clinic; and still I was successful in all cases without ever being compelled to discontinue the operation or to substitute a general anæsthetic. No other method of local anæsthesia that I am aware of can claim such results; at the same time it must be confessed that children who at the mere instillation of a drop of cocaine would raise an uproar had to be treated with unusual care in order to dispel their natural fear and distrust, particularly so, as my technique at the beginning was not very perfect.

Of the fifty-two cases thirty had absolutely no pain; thirteen whimpered somewhat, and in eight the operation was quite painful. The pain in these last eight cases I ascribe to the fact that I tried different experiments in the mode of infiltration and kind of solution. Twenty-five of the patients were under ten years of age; the youngest was one year old.

One-per-cent. holocain was substituted for cocaine in Cases 3, 5, 6, 7, 8, 9, 10, and 11, sometimes with, sometimes without adrenalin, but I could see no advantage; on the contrary, there was considerably more bleeding, and its use had to be discontinued. The addition of adrenalin in Cases 3, 4, and 10 was of no advantage. Normal salt solution in Cases 3 and 4 was a decided failure; the 0.2 % salt solution was more efficacious. I tried it in Cases 19, 20, and 23, but it had to be warmed before using it, and was positively no more advantageous than the normal solution. In order to make the introduction of the needle less painful, I tried

cocaine crystals in Cases 19, 20, and 23, but I discontinued its use, because Case 23 showed symptoms of cocaine poisoning; the patient became very dizzy, and in the other cases there was also quite some painful burning. B eucain I used in Case 22 with no advantage over normal solution. Cases 3 and 4 were most instructive. Here I used different modes of instillation and infiltration in the same patient. These cases proved that cocaine and normal solution was the most effective combination.

Another operation on the lids where the above described method was used was the extirpation of fibrous tumors from the eyelids. In one case I removed the tumor from the conjunctival side of the lid with very little pain. In Case 54, where I removed the tumors from the cutaneous side of the lid, the operation was very painful. In Cases 57 and 59 I also removed the tumor from the cutaneous side, but I infiltrated both skin and conjunctiva, with the result that the patients had absolutely no pain. In Case 57 the patient was so quiet that my assistant exclaimed towards the end of the operation, "I think the patient is sleeping." In this case, I may state in passing that the weaker normal solution was used.

In opening the abscesses of the dacryocystitis in two cases, I began to infiltrate the outer skin at some distance from the inflamed part, and raising the first wheal I reinserted within its border the needle, and so on until I had infiltrated the whole inflamed area. The opening of the abscess was absolutely painless. If we stop to consider how painful the opening of this kind of an abscess is, we must admit that this is quite an achievement. In the two cases of tenotomy of the rectus internus, the bulbar conjunctiva was raised very slightly; the operation here too was absolutely without pain, although we all know how painful this procedure is at times under cocaine instillation.

The extirpation of the lachrymal sac, in Case 54, the closing of a fistula leading into the nose in Case 57, and the operation for entropium and trichiasis in Case 63, show that the anæsthesia on the outer skin was just as satisfactory as that of the conjunctiva.

The advantages of this form of local anæsthesia in ophthalmic surgery are:

A—Over general anæsthesia:

1. Absolutely no danger.
2. No bad after-effects.
3. No hospital accommodations are necessary.
4. No assistant needed.

B—Over local anæsthesia (instillation of cocaine):

1. Absolutely no pain.
2. The anæsthesia sets in immediately after infiltration.
3. No pain after operation.
4. Can be employed in children.
5. No injury to the cornea.
6. In trachoma especially, the follicles become so prominent and so distinct that it gives us an aid in diagnosis, besides enabling us to operate directly with great ease and without lacerating healthy conjunctival tissue.

The disadvantages are:

1. The infiltration changes the aspect of the tissues, and small tumors can neither be palpated nor seen so easily, as the œdema masks the same, and a good deal of training is necessary to be able to appreciate this different aspect.
2. The technique must be thoroughly mastered.

In conclusion, I wish to state that the method I described above has given me such satisfactory results that, unless I am too optimistic, I hope that this method will entirely eliminate general anæsthesia from ophthalmic surgery.

REPORTS OF THE MEETINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By Mr. C. DEVEREUX MARSHALL.

THURSDAY, JANUARY 28, 1904. CHARLES HIGGENS, F.R.C.S., VICE-PRESIDENT, IN THE CHAIR.

Cases of proptosis.

Mr. W. H. H. Jessop read this paper and described two cases. The first was one of syphilitic origin, the patient being a man who had severe headache with swelling in the right temporal region and protrusion of the eyeball. He was treated with iodide, etc., but without much relief. The vision was reduced to counting fingers. There was slight ptosis, pupil *4mm*, inactive, optic disc pale, and a discharge from the nostril. An incision was made into the swelling and dead bone was discovered. This gave slight relief, but the pain soon returned, and Mr. Waring then undertook a very extensive operation and removed a great deal of necrosed bone, including the great wing of the sphenoid. The patient recovered and was much relieved. The second case was that of a lady who when first seen had normal acuteness of vision, but she subsequently developed retrobulbar neuritis and supraorbital neuralgia. The symptoms increased with proptosis, and tumor of the optic nerve was diagnosed. Sir Victor Horsley operated, and the growth was proved to be an endothelioma. The patient is much relieved. Mr. Jessop referred to other cases and emphasized the great relief afforded by the operations.

A plan of treatment in some cases of asthenopia.

Mr. C. Brooksbank-James, who read this paper, said that he had noticed how rare it was to see myopia developed in watch-

makers and those who used a single glass for magnifying their work, and, applying the same principle to other cases, he had come to the conclusion that the development of myopia might be arrested by similar means. He mentioned the case of a patient who had − 1.5 D of myopia, and for this he ordered a glass of + 1.5 D to be used for one eye only, so that convergence might be prevented. The myopia did not increase during many months while using this method though it increased .5 D when the ordinary myopic correction was used.

Mr. C. WORTH thought that in the cases in which pain and fatigue were present there was probably hyperphoria as well.

Mr. BISHOP HARMAN did not consider that the mere closing of one eye would prevent convergence when looking with the other eye at a near object. He thought that it would much interfere with education if this plan were adopted.

A note on the eye symptoms of rheumatoid arthritis, with special reference to the field of vision.

Mr. BEAUMONT, who read this paper, said that in spite of recent research by Bannatyne and Wohlmann there was much that was obscure in rheumatoid arthritis. After referring to the eye symptoms, he called special attention to the contraction of the fields of vision which frequently occurs.

He compared the compound charts of male and female patients and found them similar. They were arrived at by a novel method. The number of degrees from fixation point outwards was noted in each case; these were added together and divided by the number of patients examined, and so an average field was constructed. The uniformity of the fields in the two sexes excluded, he thought, hysteria, but not necessarily neurasthenia.

There was no central scotoma in rheumatoid arthritis, and no evidence of optic atrophy, and as a rule not more than a proportionate contraction of the color fields. He remarked upon the Raynaud-like symptoms that are sometimes present, and said that Dr. Samuel Lodge had noticed contraction of the fields in this disease. Possibly the contraction was due to the syncopal condition of the terminal vessels of the retina. Diagrams were shown in which expansion of the fields occurred when nitrite of amyl was inhaled, whereas in a healthy person no enlargement was noticed.

Notes on a case of tuberculosis of the choroid.

Mr. J. R. LUNN described this case. The child was six years of age, and was suffering from symptoms of general tuberculosis, being in a typhoid condition. Optic neuritis was present and a swelling was seen in the choroid. The child, however, in spite of the disease, got quite well, but the oval area in the choroid is still present.

Mr. JESSOP mentioned a somewhat similar case.

The following card specimens were shown:

Mr. JOHNSON TAYLOR: **A swelling of unusual size in the ciliary region.**

Mr. TREACHER COLLINS: **An unusual symmetrical opacity in both corneæ.**

Mr. G. W. THOMPSON: **Central choroiditis in a young man.**

Mr. G. W. ROLL: **Unusual changes in the macular region.**

Dr. D. MOWAT: **Paralysis of the inferior recti muscles.**

Dr. RAYNER BATTEN: **Subretinal hemorrhages.**

THURSDAY, FEBRUARY 11, 1904. JOHN TWEEDY, P.R.C.S., PRESIDENT, IN THE CHAIR.

Mr. BRONNER: **Notes on a case of gonorrhœal conjunctivitis in an adult treated with peroxide of hydrogen.**

The patient was a woman, aged thirty-two, whose eye had been inflamed for two days before it was seen. The lids were swollen and a profuse discharge was present. Gonococci were found easily in the discharge. Perchloride of mercury was used as a lotion as well as protargol 5 per cent. to the lids. Drops of 3 per cent. peroxide of hydrogen were used every four hours. On leaving off the peroxide the cornea rapidly became ulcerated, but on recommencing it the ulcer at once ceased spreading and healed, leaving remarkably little scar behind. Excellent vision was obtained, and Bronner had never seen so bad a case make so remarkably good a recovery. This he attributes to the peroxide. The solution he used was that made by Merck.

The PRESIDENT had used it in cases of hypopyon ulcer, but had not tried it for purulent ophthalmia. The ulcer cases did very well indeed.

Mr. HARTRIDGE said that years ago all cases of purulent ophthalmia at Moorfields were treated with it, but that for some

reason or other it had been given up. He thought that protargol of weaker strength than 20 per cent. was of very little use.

Mr. HOLMES SPICER said that some years ago he published a large number of cases of purulent ophthalmia treated at Moorfields, and he found that those treated with silver did much better than when treated only with peroxide.

Mr. BRONNER, in reply, said that he did not at all advocate its use to the exclusion of silver and other remedies, but in combination with them he was much impressed with its utility, and he hoped at a future time to have other cases to show.

On congenital anterior staphyloma.

Mr. J. HERBERT PARSONS read this paper. The patient was a girl, aged three days, who was admitted at Moorfields under the care of Mr. Fisher, with an anterior staphyloma of the left eye. The condition was noticed at birth. The mother was healthy and the confinement was normal; the child was born immediately after the rupture of the membranes. There was no other deformity.

There was a very slight mucous discharge and a complete anterior staphyloma with no anterior chamber. The iris was adherent to the pseudo-cornea, which was very thin and almost transparent.

Pathological examination showed the usual features of an anterior staphyloma, the lens was *in situ*, and the whole eye was in an early stage of panophthalmitis, the posterior chamber being full of polymorphonuclear leucocytes, which were also present in the vitreous. The true cornea at the sides showed dense infiltration; the epithelium and Descemet's membrane were present here only. The anterior capsule of the lens was ruptured; the lens was cataractous, but there was no anterior capsular cataract.

Nine previous cases of congenital anterior staphyloma with pathological examinations have been reported. All the cases show exactly the same features which are found when the condition develops in the usual manner after birth. It is probable that the intrauterine cases are due to the same cause, viz., perforation of the cornea. Traumatic perforation of the cornea under these circumstances is very improbable. Can intrauterine ulceration of the cornea occur? Endogenous infection is improbable, owing to the absence of blood-vessels in the fœtal cornea; at the same time it may be brought about by toxines.

Exogenous infection through the amniotic fluid is more probable, and accounts for the frequency of bilateral disease. There is no doubt that intrauterine transmission of infection (*e. g.*, anthrax, tubercle, etc.) can occur.

Infection per vaginam at birth can be definitely eliminated in some cases, *e. g.*, Hirschberg and Birnbacher's, and Runte's, in which the children were seen half an hour and half a day, respectively, after perfectly natural confinements. It is very improbable in the case cited, seen on the third day.

It is almost impossible to explain the cases on the theory of mal-development, and even in this case the inflammatory condition must be explained.

Mr. TREACHER COLLINS, who had seen the specimens, had come to a different conclusion, and he thought a failure in the development of the anterior chamber was the original cause of the condition. The inflammatory changes might easily have occurred in the three days following birth, and as there was a gap in the anterior capsule, he thought that there had been a perforating lesion done most likely by the finger of the accoucheur.

Mr. NETTLESHIP referred to two cases that he had seen, and Mr. PARSONS replied.

The following card specimens were shown:

Messrs. A. OGILVY and SYDNEY STEPHENSON: **Specimens from a case of epithelioma of the ocular conjunctiva.**

Mr. ARNOLD LAWSON: **Traumatic aniridia.**

Mr. BISHOP HARMAN: **Nose-blinking movements.**

Mr. HARTRIDGE: **Unusual opacity of posterior part of lens and capsule.**

Mr. G. W. THOMPSON: 1. **Double kerato-iritis in an infant.** 2. **Peculiar changes of and around the disc.**

Mr. MAYOU: **Two cases of cerebral degeneration from the same family associated with macular changes.**

Mr. JESSOP: **Epibulbar tumor.**

THURSDAY, MARCH 10, 1904. SIR ANDERSON CRITCHETT, F.R.C.S.E., VICE-PRESIDENT, IN THE CHAIR. CLINICAL EVENING.

Mr. J. R. LUNN showed a patient, an elderly man, in which there was compression of the retinal veins by thickened arteries in one eye only, although the vessels in the other eye showed some degeneration also. There was a large area above the macular region that was occupied by a hemorrhage.

Owing to the serious view of these cases taken by Mr. Gunn, he proposed to bleed the patient, and Mr. Nettleship suggested purging him as well.

Mr. Gunn said that, although he looked upon these cases in a grave light, yet, as there was no albuminuria present, he thought that this case was rather a favorable one.

Mr. H. GRIMSDALE exhibited a man aged twenty-four who had suffered from gonorrhœal ophthalmia a year ago, resulting in a dense leucoma in one eye while the other was normal. When light is allowed to shine in the right or good eye, the pupil contracts and the other eye rotates distinctly upwards, and when the light is withdrawn the reverse takes place and the affected eye rotates downwards. This condition has been previously noticed after head injuries, but has not before been described as occurring in such a case as the present one.

Mr. H. L. EASON showed a case of what he took to be a **persistent hyaloid artery.** The right eye had defective vision and nystagmus. On ophthalmoscopic examination the vessels were seen to emerge from the lower border of the disc, and one branch is seen to run forwards and open in a funnel-shaped aperture against the ciliary body below the iris. It was a question as to whether it should be considered as an inflammatory condition, or whether as a developmental condition, viz., a persistent hyaloid artery.

Mr. TREACHER COLLINS said he saw no reason for doubting that it was really a persistent hyaloid artery, but in addition there had been an atypical development of the vitreous.

Mr. EASON also showed a case of albuminuric retinitis in a patient who three years ago had acute nephritis, anasarca, and detachment of both retinæ. His general condition greatly improved and the detachment in both eyes subsided.

Mr. CLAUD WORTH showed a member of a family in which congenital dislocation of the lens was present in five generations. Twenty-four years ago Mr. Stanford Morton had described the family in a paper in the Royal London Ophthalmic Hospital Reports, and since then two more members had been born, both of whom had the same condition.

The CHAIRMAN thought that such a series of cases was most important as bearing on the subject of heredity.

Mr. NETTLESHIP thought that possibly a slight luxation of the lens in young children might account for the high degrees of

myopia that are occasionally seen and which do not get worse as time goes on.

Mr. A. H. THOMPSON showed a girl aged ten who had a congenital **coloboma of the iris** downwards in one eye. Near the periphery of the fundus and well below the macula is a white patch with indefinite edges and a band of healthy choroid crossing it. In view of the condition of the iris he took it for a coloboma, though without it he should have been inclined to regard it as a patch of choroidal atrophy. The vision was $\frac{6}{18}$ and the left eye was normal.

Mr. BISHOP HARMAN showed a child aged five years with the following abnormalities:

The anterior fontanelle is not yet closed. There is a coloboma of each upper lid. A coloboma of the iris and choroid on one side. Two dermoids of the globe on the right side. Very tortuous retinal vessels. The mouth is imperfect. There is a depression over the sacrum representing the tail (fovea sacralis). There are two ears on the right side and four on the left. The child cannot walk and says only a few words.

Mr. A. H. BENNETT showed a girl aged nine years who, when first seen in October, 1903, had keratitis punctata in the right eye, but was not again seen until she attended as an out-patient under the care of Mr. Claud Worth at the West Ham Hospital on February 18th last. The right eye had been red for a month, the sight failed, but without pain. The vision of the eye was only hand movements, the left was $\frac{6}{6}$. The right eye was inflamed with gross oily-looking patches of keratitis punctata. The iris was yellowish and the pupil was occluded. There were five tuberculous-looking masses growing near the angle of the anterior chamber, varying from the size of a shrivelled barley corn to that of No. 6 shot. These appeared to be fluffy, as though covered with exudation. The eyeball was not tender and there was no fundus reflex. The left eye was normal except for slight ciliary redness. Atropine was applied and hyd. c. creta and syr. ferri phosp. co. were given internally. Two weeks later the exudate had mostly disappeared, and small blood-vessels were seen on the surfaces of the growths. The left eye now showed typical pyramidal keratitis punctata, the vision remained the same, the lungs were healthy, but the cervical glands were enlarged. This is the condition at the present time. The family history discloses nothing either specific or tuberculous.

REPORTS OF MEETINGS OF THE OPHTHALMOLOGICAL SECTION OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. H. W. WOOTTON, Secretary.

MONDAY, JANUARY 18, 1904. DR. DUANE, PRESIDENT, IN THE CHAIR.

At the election of officers, Dr. Alexander Duane was re-elected Chairman, and Dr. H. W. Wootton, Secretary, for the ensuing year.

Dr. J. Guttman presented a case of **melano-sarcoma of the choroid.**

The patient was fifty-eight years of age. No injury or inflammatory process preceded the present affection. The patient noticed a disturbance of vision about four weeks ago. Examination of the fundus showed a partial detachment of the upper and inner part of the retina produced by a grayish dark solid tumor. With + 4 D the blood-vessels could be seen on the surface of the tumor. These blood-vessels are in continuation with those of the choroidea. The patient could count with the right affected eye fingers 3″ distant. Field of vision limited from below. The left eye had been amblyopic since childhood, and with it the patient could only count fingers at one inch.

Dr. Guttman also presented a case of **unilateral exophthalmos in Graves's disease.**

The friends of the patient had noticed for a year that his left eye had a peculiar appearance. Close examination showed that the aperture of the lids was widened and that the eyeball was somewhat protruding, straight forward. There was no tumor to

be felt in the orbit. No double images. Upon looking downward the upper lid lagged somewhat. This might have been produced by the exophthalmos. The thyroid gland was slightly enlarged on the same side. Heart and pulse normal. The patient was of a nervous disposition.

Dr. WOOTTON presented a case of **extirpation of the lachrymal sac and extirpation of the lachrymal gland.**

The patient (an adult) had suffered from chronic dacryocystitis for a number of years. Bowman's operation had been followed by repeated probings at various institutions.

As these measures seemed unsuccessful, it was proposed to extirpate the lachrymal sac. An appointment was made for the operation and the patient returned four days later, presenting an acute dacryocystitis; the abscess was on the point of rupture. The sac was removed and the wound healed partly by first intention and partly by granulation, and suppuration ceased. The eye, however, remained moist and, three months later, the lachrymal gland was removed with the result that the eye was now as dry as its fellow.

The palpebral ligament was cut during the extirpation of the sac and was stitched at the conclusion of the operation, but as the tissues were sloughy, the sutures cut out. Dr. Wootton proposed to remedy this defect by a subsequent operation.

Dr. CLAIBORNE had seen cases with less cicatricial contraction.

Dr. ARNOLD KNAPP preferred not to operate in the acute stage.

Dr. DUANE thought it a good plan to operate in the acute stage although more difficult; the time of healing was not longer and primary union was possible. He described his case of the same nature.

Dr. MARPLE thought the operation more easily performed when the canthal ligament was cut, and had seen the best results when this had been done.

Dr. CLAIBORNE thought it a mistake to cut the canthal ligament.

Dr. E. L. OATMAN reported a case of **lymphangiectasia of the cornea.** (Published in these ARCHIVES vol. xxxiii., p. 287, etc., under the title of "Corneal Cysts, their Etiology and Pathology.")

Dr. OATMAN reported a case of **conglomerate tubercle of ciliary body.**

An apparently healthy infant was nursed by a tuberculous mother until within three months before the latter's death.

A small, gray, non-inflammatory ulcer appeared on the sclera over the ciliary body. The sclera was gradually softened and perforated. A guinea-pig, inoculated with material from the ulcer, died with general tuberculosis. Enucleation. A classical tuberculoma occupied the ocular walls and ciliary body. Two months later the child died from meningitis.

Dr. OATMAN exhibited microscope slides illustrating a method of **cyst formation in the iris.**

Following an iridectomy, the iris stump remained in the posterior lips of the incision.

The proliferating corneal epithelium, after lining the wound, extended into and lined a crypt of the incarcerated iris. Subsequent cicatrization of the cornea severed the ingrowing epithelium from the corneal layers and converted the epithelium-lined crypt into an isolated cyst of the iris.

Dr. DWIGHT M. HUNTER presented a boy eighteen years of age upon whom he had performed **Mules's operation** four or five years ago. The ball was still retained and the movements good. About two months ago a small superficial cyst formed in the line of the cicatrix just beneath the conjunctiva. This Dr. Hunter intended to remove. Dr. Hunter also presented a patient upon whom, about eight weeks previously, he had operated for the **restoration of the lower cul-de-sac,** to give sufficient depth for the wearing of an artificial eye. A skin graft was taken from the arm and anchored to the periosteum and facia at the lower margin of the orbit after the method described by Dr. Weeks. The skin graft was about 1½–2 inches. So far the result has been satisfactory.

Dr. CLAIBORNE thought in reference to the case of Mules's operation that it was impossible to be certain that any foreign body would stay in the scleral cavity with the exception of paraffin. He believed that Mules's operation was still to be regarded as an experiment.

Dr. T. R. CHAMBERS preferred the glass ball to paraffin. He could show quite a number of people wearing glass balls operated upon some years ago. Even if failure took place ultimately, the patient might have had, perhaps, four or five years of comfort.

Dr. OATMAN thought that if paraffin was used it ought not to be injected hot but should be used in the shape of a ball.

Dr. FRANCIS VALK did not think that the slightly increased motility afforded by Mules's operation compensated for the danger of extrusion of the ball. He preferred simply stitching the muscles together after enucleation.

Dr. MARPLE spoke favorably of enucleation with a small glass ball under the artificial eye to prevent sinking. He had tried it and had been greatly pleased.

Dr. H. H. SEABROOK stated that in performing enucleation he had ceased to divide the muscles on the hook. He detached them from the sclera close to their insertion, thus preserving as much of their length as possible.

Dr. CLAIBORNE thought that if a better stump was required than that furnished by enucleation, it could be obtained by evisceration in cases not septic.

Dr. HUNTER in conclusion said that with an ordinary enucleation and the Snellen eye the result was as good as with Mules's operation. He had ceased to perform the latter, having once seen it followed by sympathetic ophthalmia.

Dr. ARNOLD KNAPP exhibited a specimen of a **diffuse sarcoma of the choroid** occurring in a woman twenty-eight years of age. It extended from the ciliary body to the optic nerve, chiefly involving the suprachoroidea, with one episcleral nodule. The type of cells was that of endothelium.

Dr. WARD A. HOLDEN and Dr. G. Y. RUSK exhibited specimens of a **metastatic carcinoma of the choroid from a primary growth in the ovary.**

A complete detachment of the retina was found in the left eye of an insane woman of thirty-five from whom no history could be obtained. The intraocular tension was never increased in the six weeks she was under observation, even though atropine was instilled. At the autopsy, many small metastases were found in the brain and abdominal organs, and a typical flat growth in the choroid.

Dr. DUANE exhibited a colored drawing representing **a coloboma of the retina at the macula.**

Dr. J. O. TANSLEY exhibited three cases:

I.—**Case of atrophy of the iris.**

Patient was thirty years of age. Ten years ago had severe iritis with several posterior synechiæ. Five years ago had a mild attack of iritis which lasted for about a week; no synechiæ. After each of these attacks his eye returned to its normal condition and without synechiæ and normal pupil. At the present time the pupil is peculiar. When dilated it is of normal appearance. When contracted it is the shape of a top with the broad portion down and the pointed portion up, as though a synechia held the iris back and prevented its contracting. Corresponding to the location of a congenital coloboma iridis, all coloring matter is absent. This portion of the iris consists of a lacework of fibres, through which the red reflex of the fundus is clearly seen. Were it not for the fact that he had repeatedly examined this eye with an ophthalmoscope and otherwise during the patient's two attacks of iritis and never had found the present condition, he should be certain that it was a case of partial congenital coloboma iridis. There is no coloboma of the ciliary body or choroid.

II.—**Crystals in vitreous body.**[1]

Patient was sixty years of age and vision was normal in both eyes. Vitreous full of small white discs chiefly in the anterior portion, but extending almost to the retina. These do not float, but have a springy motion, yet retain their places; do not glisten or scintillate, but have the appearance of snowflakes; do not affect the picture of the fundus at all, which appears healthy in every particular.

III.—The patient was a male thirty-four years of age. In September, 1901, patient had a sudden dimming of the vision of the right eye. This passed away, and subsequently he had several attacks of dimness, which would pass away after seven or ten days. In June last he had a very severe attack, and three days ago had another attack. Vitreous hazy; cannot see disc. Protruding into the vitreous body, from the ciliary region inferotemporally, there is quite a large *hemorrhage* which is surrounded by a grayish-white exudate; this same exudate passes in and back of the hemorrhage to, and slightly beyond, the equator of the eye. It looks very much like a detachment, but it is motionless and has no vessels upon it. The disc cannot be seen, and the vessels can only be indistinctly traced for a short distance

[1] Synchysis alba.—ED.

upwards and nasally, vitreous is so cloudy. At the present time, January, the hemorrhage has increased and the vitreous is absolutely opaque. There is only perception of light and no examination of the fundus can be made. Pupil responds to light stimulation of either eye and tension is normal. The condition has not responded to any treatment. The patient's sputa are loaded with tubercle bacilli, and the inference is that **the vitreous is tuberculous,** but this cannot be proved.

Dr. SEABROOK had seen a case of keratitis clear up under quinine in a patient with a history of malaria. This case had been treated by others for iritis. There was congenital atrophy of a portion of the iris, causing irregular dilatation of the pupil.

MEETING OF MONDAY, FEBRUARY 15, 1904. PRESIDENT, DR. DUANE IN THE CHAIR.

Dr. F. J. PARKER presented a case of **acromegaly with bitemporal hemianopsia and hemiopic pupillary reaction.**

The patient was a female thirty-nine years of age. Disease began in 1887, when the hands, feet, and face commenced to enlarge, and the enlargement has since continued. In October last the right eye diverged, and she suffered from diplopia at times, with blurring of vision and severe pain in the back of the eyes. Divergent strabismus measured 30 degrees. V O D $\frac{20}{40}$; V O S $\frac{20}{30}$ with correction. Fundus was normal. Field showed bitemporal hemianopsia, and Wernicke's hemiopic pupillary reaction was well marked in each eye. The pupils both react to accommodation. The existence of the Wernicke symptom showed that the lesion was situated anteriorly to the corpora quadrigemina.

Dr. SCHLOPP stated that Dr. Parker's case had suffered from time to time from temporary polyuria and glycosuria. The heart and spleen were enlarged, which were rather unusual features. In most cases of acromegaly, disease of the hypophysis was found. The thyroid gland was atrophied in many cases, and the thymus gland was sometimes present. The process was one of derangement of metabolism with increase of connective tissue throughout the body. The removal of the hypophysis in animals had resulted in no change in the animal's condition.

Dr. H. W. WOOTTON presented a case of **paralysis of divergence.** The patient was a female eighteen years of age, who, a

year previously, developed diplopia without any accompanying symptoms. Diplopia existed until the present time. At a distance of eighteen inches from the face, and between this point and two inches, fixation existed. At a distance more remote convergent squint was present, the degree increasing as the test object was withdrawn from the face. The homonymous diplopia did not increase either to the right or to the left, and the outward turning of each eye tested separately was found to be normal, about 50°. The case appeared to come within the category of those already classified as resulting from some lesion of the centre of divergence.

Dr. CUTLER stated that, in his opinion, these cases were probably not so uncommon as usually supposed, and that more would probably be found if more were looked for. He gave the history of two cases which he had seen during the past year, and stated that sometimes cases of this nature recovered without treatment.

Dr. DUANE had seen two cases within the last two years, one occurring with symptoms of tabes. In some cases, diplopia could be elicited but not constantly. Two of the reported cases had originated from an abducens paralysis, and one preceded an abducens paralysis, showing perhaps that the lesion was near the nucleus of the sixth nerve.

Dr. CUTLER presented a specimen of an **aneurism pressing on the chiasm.** The history began in 1901. The patient had then noticed a slight blur before the left eye for about six months. There had been much headache, mostly in the morning. The blur seemed to occur at this time when reading or writing only; that is, when looking downward or from side to side along the lines. Vision for both eyes was normal with correction. He noticed at this time that the nerve, especially its temporal half, was pale. About a year later the arteries were a little small with faint lines along some of them. The signs of arterio-sclerosis were also evident in the radials. In August, 1902, she returned with the vision of the left eye somewhat more distinct, but the right eye had lost the outer part of the field. He was unable at this time to get Wernicke's hemiopic reflex, but six months later it was obtained. The patient remained about the same until December, when vision failed rapidly, with no increase of pain or subjective sensations, except that there was loss of light perception at times more than the loss of form sense would account for.

An interesting terminal feature that was noticed for a week

before her death in the latter part of May, 1902, was that vision improved moderately, so that objects and colors were recognized. The autopsy showed a round aneurism pressing upon the chiasm. It sprang from the left internal carotid. The presence of a small quantity of old extravasation, as well as a quantity of fresh blood, showed that leakage must have continued for some time. The treatment had consisted in the administration of iodide of potassium and attention to the general health. It was supposed that the pressure was caused by a tumor. Aneurism was of course considered. Ligature of the carotid would have been justifiable and perhaps helpful even if the tumor had not been aneurism.

Dr. J. GUTTMAN read a paper entitled **A preliminary report of a new method for the application of local anæsthesia in operations on the eyeball and eyelids, especially in trachoma.** (Published in full in these ARCHIVES, vol. xxxiii., p. 302, etc.)

Dr. H. KNAPP had tried Dr. Guttman's method and liked it, for it was precise and brought out the granulations distinctly.

Dr. J. E. WEEKS had seen it tried, and the trachoma tissue had been completely removed. He had been quite impressed that no pain had been experienced. The œdema of the lids, however, had been great. Four days later some swelling and reaction were evident, but no adhesions. The case had been quite well marked. In regard to the use of this method in performing tenotomies he had tried it, but preferred the instillation of cocaine.

Dr. KOLLER had employed cocaine infiltration in operating in trachoma for some years, but had returned to ether as allowing the operation to be more thorough.

Dr. GRUENING had not been greatly impressed with the case in which he had seen the method tried. In operating for trachoma, he preferred nitrous-oxide gas.

Dr. GUTTMAN, in closing, thought it was not so much the action of the cocaine as the infiltration, that was important. The amount of cocaine was very minute, and he thought simply rendered the injection painless.

Dr. JOHN E. WEEKS presented the following patients:

Two patients upon whom operations for **cicatricial ectropium** were performed. The first, a male, had the skin of the upper lid

destroyed by molten metal. The upper lid was completely everted so that the entire palpebral conjunctiva was exposed. The operation consisted in dissecting the lid from the brow, freshening its margin, and attaching it to the margin of the lower lid and making the denuded surface as large as possible by carrying the sutures through the skin of the cheek. The defect, which measured 1¼ inches in the longitudinal meridian and 1½ inches in the vertical, was covered with a flap taken from the inner surface of the arm. Healing was complete, the lid being fully restored.

The second case was one of destruction of the lid in the course of an attack of facial erysipelas. The same procedure was employed in this case with success. Dr. Weeks permits an interrupted union between the margin of the lids to remain until shrinkage of the flap is complete—about three months.

The third case was one of **complete blindness following hemorrhage from the stomach.** Three hemorrhages occurred at intervals of five and three days respectively, the blindness being complete twenty-four hours after the last hemorrhage. The amount of blood lost at the last hemorrhage was sufficient to cause the patient to faint. He remained in bed three weeks after the last hemorrhage before his strength was sufficient to permit him to be about his room.

The fourth case was one of **partial optic-nerve atrophy, apparently due to pressure from a specific periostitis occurring at the optic foramen on each side.** The fields of vision, which presented in the right eye a concentric limitation and in the left a nasal hemianopsia, improved under anti-syphilitic treatment.

The fifth case was one showing **retraction movements of the eyeball.** The patient, a male, twenty years of age, displayed very defective movements of the left eye. The rotation inward equalled 17 deg.; outward, 10 deg.; upward and downward, approximately normal in extent. When the head was in the primary position, actual measurements showed the left eye to be ⅔*mm* deeper in the orbit than the right, the palpebral fissure being 1*mm* narrower than the right. On forcible attempts at rotation to the right, the left eye receded 3⅓*mm*, the palpebral fissure becoming 2½*mm* in width. On forcible rotation to the left, the left eye advanced to the level of the right and the palpebral fissure became ½*mm* wider than that of the right. The vision in both eyes, with correction of a slight error of refraction,

was approximately normal, and binocular single vision was maintained when the head was tilted slightly to the right. The condition was congenital. No operation of any kind had been performed. The exact mechanism in explanation of the defect was not fully determined.

Dr. CASEY WOOD stated that he thought, in cases of amaurosis after hemorrhage, the loss of blood *per se* had nothing to do with the blindness. As far as he knew, it never occurred after severe phlebotomies, and after severe battles these cases were unknown. He thought that the actual cause of the amaurosis had not been determined.

Dr. WEEKS thought that the theory of starvation of the retinal neurons answered very well as an explanation.

Dr. DUANE thought that in Dr. Weeks's fourth case, while we were apt to consider that such fields must be due to chiasm disease, many were probably cases of peculiar forms of atrophy of the nerve.

Dr. WEEKS thought that there had been an inflammatory process at about the point of entrance of the nerve into the optic foramen.

Dr. WOLFF thought that cases such as Dr. Weeks's fifth case were not so rare as one might suppose. He had seen at least ten in the last few years. In his opinion, it was always the externus that was paralyzed, and retraction always took place on attempted internal rotation, with narrowing of the palpebral fissure.

Dr. DUANE stated that cases of marked retraction had been reported during upward movements of the eyeball.

Dr. SCHAPRINGER thought that the cause in some cases was a simultaneous contraction of the superior and inferior rectus, in the absence of action of the internus and externus, and this would cause the eye to turn in and retract; or the simultaneous action of the two obliques under similar conditions would cause the eye to turn outward and forward. The elevation of the eye in internal rotation would be accounted for by an excessive innervation of the superior rectus.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE SECOND QUARTER OF THE YEAR 1903.

By Dr. G. ABELSDORFF, in Berlin; Prof. ST. BERNHEIMER, in Innsbruck; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Dr. R. SCHWEIGGER, in Berlin;

WITH THE ASSISTANCE OF

Prof. A. Alling, New Haven; Prof. E. Berger, Paris; Dr. Dalén, Stockholm; Prof. Hirschmann, Charcow; Dr. J. Jitta, Amsterdam; Dr. Krahnstöver, Rome; Mr. C. Devereux Marshall, London; Dr. P. von Mittelstädt, Metz; Dr. H. Schultz, Berlin; Prof. Da Gama Pinto, Lisbon; and others.

Translated by Dr. Ward A. Holden.

Sections I.–III. Reviewed by Prof. C. HORSTMANN, Berlin.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

141. **Leber.** The circulatory and nutritive conditions of the eye. *Graefe-Saemisch.* Second edition.

142. **Landolt.** Methods of examination. *Ibid.*

143. **Eversbusch.** Affections of the eye in their relation to disease of the nose and neighboring cavities, and to disease of the ear. *Ibid.*

144. **Greeff.** The eye. Second half, first part. In Orth's *Text-book of Pathological Anatomy.* Berlin, 1903. Hirschwald.

145. **May, Charles H.** *Manual of Diseases of the Eye.* Authorized German edition, translated by E. N. Oppenheimer. Berlin, 1903. Hirschwald.

146. **Bock.** Spectacles. Vienna, 1903. Safar.

147. **Uhthoff.** *Stereoscopic Med. Atlas.* Edited by Niesser. Part 51. Breslau, 1903.

148. **Javal.** *Entre aveugles* (addressed to persons who have lost their sight). Paris, 1903. Masson.

149. **Cohn** and **Rübenkamp.** How shall books and periodicals be printed? Brunswick, 1903.

150. **Schoute.** A report on the number of books used in the free elementary schools in Amsterdam that are satisfactory from a hygienic standpoint, Amsterdam, 1903.

151. **Feldhaus.** The history of magnet operations on the eye. *Centralbl. f. prakt. Augenheilk.*, xxvii., p. 138.

152. **Hale, B. A.** Confessions of a traveller. *Ophth. Rec.*, March–April. 1903.

LEBER's (141) classic section in *Graefe-Saemisch* has been increased from ninety pages in the first edition to five hundred and thirty-four in the second, forming the most detailed, complete, and carefully prepared treatise that has yet appeared on the subject.

The second part of LANDOLT's (142) "Methods of Examination" contains sections on Keratoscopy and Keratometry by Fick, and one on Dioptrometry by Landolt.

EVERSBUSCH (143), in the section on the relations of affections of the eyes to the nose and neighboring cavities, contains a résumé of all that is known on the subject.

The first part of the second half of the pathological anatomy of the eye by GREEFF (144) contains chapters on the choroid, sympathetic ophthalmia, myopia, glaucoma, and hydrophthalmus, retina, optic nerve, and central vascular system. The work is distinguished by the clear and precise manner of presentation and by its comprehensiveness.

MAY's (145) *Manual of Ophthalmology*, which is in successful use in many of the American schools, has been translated into German by Oppenheimer. The book is essentially intended for the general practitioner, whose wants it well supplies.

BOCK's (146) monograph is a historical sketch of glasses and their use.

The fifty-first fascicle of the stereoscopic atlas of UHTHOFF (147) contains: Vesicular scars, oculomotor paralysis, desiccation of the conjunctiva, dilated conjunctival vessels, shot injury, pulsating exophthalmus, congenital microphthalmus, etc.

JAVAL (148) had the misfortune to become blind in his seventieth year. Previously persons interested in the blind had concerned themselves only with the education of the young. Javal addresses himself to the families and physicians of the blind and offers them counsel.

COHN and RÜBENKAMP (149) discuss not only the type, the papers, and the inks that are trying to the eyes, but by means of examples they show authors, publishers, and printers how type, paper, and ink should be used in order to stand the test of ocular hygiene.

SCHOUTE (150) considers type and its arrangement, paper, and ink, and finds that in the schools of Amsterdam 4 % of the books are above criticism, 80 % are good enough to be used, and 16 % are positively bad. ZITTA.

According to FELDHAUS (151) Braunschweig described magnet operations on the eye in 1497, Fabricius Hildanus on the surface of the cornea in 1656, Meyer through scleral wounds in 1842, and MacKeown through the coats of the eye. Hirschberg devised the electro-magnet for the eye in 1876.

HALE (152) describes in a very appreciative, somewhat optimistic vein his visits to European ophthalmic hospitals, in particular the German university clinics. He begins with Hamburg, where lately a new eye hospital has been added to the world-famous hospital completed at Eppendorf. Then he visits Kiel, where he received his ophthalmological education; furthermore, Berlin, Breslau, Würzburg, Freiburg, Utrecht, and London. Together with the buildings he details the internal arrangements of these institutions, as well as the leading men and their work. The article is attractive and instructive.

H. KNAPP.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

153. **Stock.** Pathological investigations on experimental endogenous tuberculosis of the eye in rabbits. *Klin. Monatsbl. f. Augenheilk.*, xli., Beilageheft, p. 17.

154. **De Lapersonne.** Spinal lymphocytosis and ocular affections. *Arch. d'opht.*, xxiii., 6, p. 337.

155. **Rumschewitsch.** On ossification and calcification in the eye. *Arch. f. Augenheilk.*, xlviii., p. 113.

156. **Weinstein.** Experimental investigations on the healing process after perforating incised wounds of the cornea. *Ibid.*, p. 1.

157. **Nicati.** Partial ablation of the eyeball by subnucleation. *Arch. d'opht.*, xxiii., 6, p. 347.

158. **Maslenikoff.** Subconjunctival injections of iodoform. *Wjest. Ophth.*, 1903, No. 2.

159. **Hinshelwood.** Three cases of different forms of congenital syphilitic diseases of the eye occurring in the same family. *Glasgow Med. Journ.*, Apr., 1903.

160. **Zentmeyer.** A clinical note on the treatment of panophthalmitis by the method of Van Milligen. *Ophth. Record*, March, 1903.

Stock (153) injected an emulsion of tubercle bacilli into the ear veins of a number of rabbits. Tuberculosis of the eye developed in nearly every case, changes taking place in the choroid, iris, and ciliary body. The disease brought about by this endogenous infection ran a course quite different from that of the disease as produced by direct inoculations of the aqueous or vitreous by means of cultures. In the former, external signs of inflammation are not so evident and the disease has a greater tendency to recover. The picture in general is that of an attenuated tuberculosis.

De Lapersonne (154) made a lumbar puncture in seventeen cases and found lymphocytosis eight times in fresh cases of syphilitic disease of the uveal tract and optic nerve, but lymphocytosis was wanting in meningitis, optic neuritis, ocular migraine, and brain tumor. In brain tumor, lumbar puncture lessened the pain and improved vision slightly. Lumbar puncture is thus of considerable value in diagnosis. v. Mittelstädt.

Rumschewitsch (155) states that calcareous deposits in corneal cicatrices, particularly in cases of staphyloma, have long been known, but such deposits in the sclera have been observed once only. In atrophy of the iris they are sometimes found; chalky deposits in the lens may be found alone or with ossification of the choroid. True bone may be found in the lens if the capsule has been ruptured. Ossification in the vitreous may follow fibrous degeneration. In cyclitic membranes it is common. Chalky deposits about the retinal vessels are common, but bone in the retina always is in connection with bone in the choroid or in choroidal membranes.

Weinstein (156) finds that after incised wounds of the cornea the epithelium is regenerated first, then the substantia propria, and last the membrane of Descemet. The regeneration of epithelium is due to an active process of proliferation which begins at once, attains its height in three or four hours, and gradually diminishes from the end of the first day. The first mitoses may appear at a distance from the wound, but three hours later they are always to be found in its immediate neighborhood. As the substantia propria is regenerated, the epithelium, which has sunk into the wound, is gradually pushed up and the superfluous por-

tion dies, but the epithelial layer always remains a little thicker than normal near the wound. The regeneration of the substantia propria is accomplished by its own cellular elements. Leucocytes play no part in the process. Mitoses are observed at some distance four or five hours after the injury. Evidences of cell division immediately about the injury are seen in the course of two days, and granulation tissue may appear in the wound in the course of three days. The anterior portion of the wound usually fills with granulation tissue while the posterior portion long remains filled with a plug of fibrin which plays a passive rôle. The endothelium regenerates at the same time as the substantia propria, and the membrane of Descemet may be fully restored long after the other portions of the cornea.

In order that an artificial eye may be better worn NICATI (157) performs an operation which he calls "subnucleation" as follows: After passing a thread through the internal rectus, its tendon is cut, then the optic nerve is divided, the ball is turned round, the obliqui are divided, and the entire posterior segment of the ball is cut away as far forward as the attachment of the recti muscles. The contents of the ball are removed and the tendon of the internal rectus is then sutured to the sclera near the cornea. Hemorrhages force the cornea forward, but healing proceeds more rapidly than after the ordinary enucleation. The cornea soon atrophies and a good stump remains with a large conjunctival sac. v. MITTELSTÄDT.

MASLENIKOFF (158) injected cultures of staphylococci into the cornea of rabbits, and when on the following day a violent inflammation had been set up he made subconjunctival injections of iodoform, and the eyes so treated recovered more quickly than control eyes. A hypodermic syringe filled with an ethereal solution will contain 0.14 of iodoform. Two or three divisions of the syringe contain enough for an ordinary injection. The ether evaporates at once and pure iodoform is precipitated and remains beneath the conjunctiva.

The injections were used in man in seven cases of infected corneal ulcer with good results. The injection in man causes pain, œdema, and congestion, but no ulceration and no necrosis. It is dissolved in a few days. HIRSCHMANN.

The three cases observed by HINSHELWOOD (159) were these. The eldest was a girl aged fourteen. The pupils were irregular and posterior synechiæ were present. She had had interstitial

keratitis five years ago. She had also the ear and the teeth affected. The second was a boy aged twelve with typical teeth. The anterior part of the eye was healthy, but the fundus showed retinal degeneration, looking as if it had been sprinkled with coal dust; the discs were pale, and the vessels were small. The third was a girl aged nine with teeth rather approaching Hutchinson's type. The anterior part of the eye was quite healthy, but there was well marked choroiditis, the discs were pale, and the vessels were small. The family history is given and is typical. The treatment is also discussed. MARSHALL.

The method of Van Milligen for arrest of panophthalmitis consists in entering the wound with the electro-cautery and cauterizing the vitreous to a considerable depth. It was employed by ZENTMEYER (160) in one case with success. ALLING.

III.—INSTRUMENTS AND REMEDIES.

161. **Koenigstein.** Protargol in ophthalmic practice. *Wiener med. Presse*, No. 14, 1903.

162. **Maklakoff.** On jequiritol treatment. *Wjest. Ophth.*, 1903, No. 2.

163. **Kraus.** On jequiritol. *Zeitschr. f. Augenheilk.*, x., pp. 34 and 122.

164. **Krotoff.** On the action of citrate of copper in eye diseases. *Wratsch*, 1903, No. 17.

165. **Krauss.** On the use of acoin-cocaine for local anæsthesia. *Münch. med. Wochenschr.*, 1903, No. 34.

166. **Imre.** Sublamin as a conjunctival disinfectant. *Die Heilkunde*, vii., 9.

167. **Rochon-Duvigneaud.** A pince-ciseaux for the incision of secondary cataracts. *Arch. d'opht.*, xxiii., 9, p. 561.

168. **Lang, William.** A note on the use of Haab's magnet. *Royal London Ophth. Hosp. Reports*, xv., part 3.

According to KOENIGSTEIN (161), protargol is less efficient as a disinfectant than silver, although it causes less pain and irritation. In virulent keratitis, nitrate of silver is preferable. Protargol acts well in cases of suppuration in the tear sac.

After treating four cases, MAKLAKOFF (162) concludes: 1. That trachomatous conjunctivitis reacts very slowly to jequiritol. 2. That in the progressive stage of parenchymatous keratitis jequiritol is of no benefit. 3. That in the regressive stage of parenchymatous keratitis, when irritants like the yellow-oxide salve are of value, treatment with jequiritol may be of benefit

since it irritates greatly and favors the formation of vessels in the cornea.

KRAUS (163) recommends jequiritol in superficial opacities of the cornea. It should not be used in purulent processes.

KROTOFF (164) tried citrate of copper, as recommended by Arlt and later by Beck, in 109 patients with pannus and other corneal opacities and in granular trachoma and chronic conjunctivitis. He used: (1) a powder citrate of copper 5–10 to sugar 100; (2) a salve 5–20 % in vaselin or lanolin; (3) in rods 20 % citrate of copper with gum arabic, starch, sugar, and glycerine; and (4) as a solution. The best results were in cases of pannus tenuis. In fresh trachoma the rods were of service. In pannus crassus with xerosis it proved to be of no value. It is also valueless in cases in which nitrate of silver is indicated. In maculæ of the cornea it was almost always of service. HIRSCHMANN.

KRAUSS (165) recommends acoin-cocaine (acoin 0.025, cocaine 0.05, water 5.00) injected subcutaneously for operations on the skin about the eyes; and also for operations on the conjunctiva, muscles, or lachrymal apparatus.

IMRE (166) recommends 1:1000 solution of sublamin (æthylendramin-sulphate of silver) in purulent conjunctivitis, blennorrhœa, and trachoma.

ROCHON-DUVIGNEAUD (167) believes scissors preferable to the needle in operations for secondary cataract, and he has devised a pince-ciseaux with blades curved in the plane of their cutting edges. The lower blade is pointed in order to pierce the membrane, while the blunt-pointed upper blade by reason of its curvature passes between the cornea and cataract without being caught in the latter. v. MITTELSTÄDT.

LANG (168) has found difficulty in extracting foreign bodies which have become lodged in the posterior chamber, and in order to overcome this he uses a steel spatula which he introduces through a valvular opening in the cornea and passes it between the iris and the lens. This is now connected to Haab's magnet by means of a few strands of soft iron wire, twisted to form a rope. On withdrawing it the piece of metal will be found adhering to it. The iris is not bruised or torn by this means.

MARSHALL.

Sections IV.–VII. Reviewed by Dr. G. ABELSDORFF, Berlin.

IV.— ANATOMY.

169. **Cirincione.** On the genesis of the vitreous in vertebrates. *Centralbl. f. prakt. Augenhèilk.*, xxvii., p. 161.

170. **Henschen.** The projection of the retina upon the calcarine cortex. *Semaine méd.*, No. 16, p. 125, 1903.

171. **Nettleship.** On the distribution of the choroidal arteries as a factor in the localization of certain forms of choroiditis and retinitis. *Royal London Ophth. Hosp. Rèports*, vol. xv., part 3.

172. **Henderson, E. E.** The ophthalmic arteries in the rabbit and dog. *Ibid.*

Cirincione (169), basing his opinion upon embryological researches, believes that the vitreous is of mesodermic origin. The first phase of development in which the fibrillæ of the vitreous develop from mesodermic cells is followed by a second phase in which the retinal cells anterior to the ora serrata take part. The vitreous humor lying in the stroma of the vitreous comes first from the retinal cells and the inner vessels. After the hyaloid and the limiting membrane of the retina are formed and the vessels are absorbed, the vitreous fluid is produced by the ciliary body and the pars ciliaris retinæ.

Henschen (170), opposing Monakoff, believes that different portions of the retina correspond to particular localizations in the cortical visual centre. In cases in which the upper or lower half of the field was wanting in the two eyes, Henschen found at the autopsy that the upper margin of the calcarine fissure corresponded to the upper half of the retina, and the lower margin to the lower half of the retina. Theoretically, therefore, one might suppose that the floor of the fissure corresponded to the middle zone of the retina, and in fact the anatomical examination of one of Wilbrand's cases with a hemianopic scotoma in the shape of a horizontal stripe reaching to the fixation point, showed pathological changes limited to the bottom of the calcarine fissure. Berger.

Nettleship (171), in this paper, which is founded on a lecture he delivered at the hospital, considers there is some relation between the distribution of the blood-vessels of the choroid and the development of various forms of choroiditis and retinitis pigmentosa. Marshall.

In HENDERSON'S (172) anatomical study six dogs and six rabbits were used. The arteries were injected with plaster of Paris and careful dissections were made on each side. It is illustrated with numerous diagrams, and will be of considerable use to those engaged in research work on the intraocular circulation.

MARSHALL.

V.—PHYSIOLOGY.

173. **Heymans.** On the minimal differences perceptible in mixtures of contrasting colors. *Zeitschr. f. Psychol. u. Physiol. d. Sinnesorgane*, xxxii., 1, p. 38.

174. **Piper.** On the dependence of the excitation value of luminous objects upon their angular area. *Ibid.*, 2, p. 98.

175. **v. Kries.** On the perception of flicker by normal-sighted and totally color-blind persons. *Ibid.*, 2, p. 113.

176. **Hess.** Observations on the foveal vision of the totally color-blind. *Pflueger's Arch. f. d. ges. Physiol.*, 95, p. 357.

177. **Landolt, H.** On the innervation of the lachrymal gland. *Ibid.*, 98, p. 189.

178. **Ludwig.** Demonstration of the protrusion of the eyeball when the palpebral fissure is widened voluntarily. *Klin. Monatsbl. f. Augenheilk.*, xli., Beilageheft, p. 389.

179. **Parsons** and **Snowball.** On the relations between intraocular tension and the general blood-pressure. *R. L. O. Hosp. Reports*, vol. 15, part 3.

180. **Dunn, Percy.** Test types for the pocket. *Brit. Med. Journ.*, May 9, 1903.

181. **Anderson.** Effect of excision of the ciliary ganglion on the pupil. *Journal of Physiology*, vol. 28, No. 3.

182. **Nettleship.** On the influence of over-use and fatigue of the eyes, in causing organic disease of the retina and choroid. *R. L. O. Hosp. Reports*, vol. 15, part 3.

183. **Jackson.** The ophthalmoscopic examination of the macula. *Ophth. Record*, June, 1903.

184. **Verhoeff.** A simple test for stereoscopic vision. *Ibid.*, May, 1903.

HEYMANS (173) mixed, by means of the rotating disc, pairs of colors of equal luminosity, viz., red and bluish-green, brownish yellow and blue, and also black and white. By varying the relative quantities of the two colors he determined the minimum amount of replacement of one color by another that could be perceived. With black and white the minimum amount increases as more white is added, and for color mixtures the minimum is least in the medium grayish mixtures, increasing as one color or the other predominates.

PIPER (174) found that, when the retina was adapted for dark, large test objects were seen in the periphery of the field, while smaller objects were not perceived. With the periphery of the retina adapted for light, perception depends upon luminosity, and but little upon size of the test object.

LANDOLT (177) gives a résumé of the cases observed clinically, which seem to indicate an influence upon the secretion of tears by the facial nerve, in that paralysis of the nerve trunk checks secretion upon that side while excitation increases it. He then mentions the physiological experiments that have been made and describes his own experiments on monkeys and rabbits. In these animals there are secretory fibres for the lachrymal gland in the facial trunk. These leave the facial in the ganglion geniculi and enter the N. petrosus superficialis, and then, as experiments show, they reappear in the N. maxillaris superior of the rabbit. The question as to the origin of these fibres, however, remains unsettled.

LUDWIG (178) has shown by flash-light photographs, in confirmation of other methods, that with a widening of the palpebral aperture from 10 to 14.8*mm* the ball projects 0.85*mm*.

The paper by PARSONS and SNOWBALL (179) is the result of about forty experiments performed upon dogs and a few upon cats. After complete anæsthesia the blood pressure was usually taken from the femoral artery and occasionally from the carotid artery on the side opposite to the eye that was being observed. The intraocular pressure was taken sometimes in the vitreous and sometimes in the anterior chamber. All the animals were completely curarized. Stimulation in the cat of the peripheral end of the cervical sympathetic was always followed by a considerable rise of intraocular pressure, and this is due not to a vascular change, but to the pressure exerted upon the globe by the contraction of unstriped muscle in the orbit. Stimulation of the peripheral end of the fifth nerve had no effect on intraocular tension.

Intraocular tension responds passively to all variations in general blood-pressure.

The intraocular pressure can be varied mechanically, by stimulation of nerves, by drugs, asphyxia, and death. The results of these various methods are recorded. MARSHALL.

DUNN'S (180) test types can be obtained from Mr. Davidson at 140 Great Portland Street, and the point about them is that

they fold up into a convenient size for carrying in the pocket. On one side are Snellen's distant types, and on the other side are the reading types. MARSHALL.

ANDERSON (181) experimented by excising the ciliary ganglion in a series of kittens, and he was able to obtain paradoxical pupillo-constriction of the denervated sphincter. This is not due to increased tone but to increased excitability, brought on by very slight stimuli, such as picking up the animal, etc. MARSHALL.

After referring at some length to cases of blindness or scotoma after looking at the sun, in eclipse, for instance, and to exposure to other bright light, NETTLESHIP (182) concludes that in elderly myopic persons hemorrhage into the choroid or vitreous is not uncommon as the result of continued overuse of the eyes. He has also seen organic lesions in otherwise healthy eyes produced by overuse in doing fine work, and he has come to attribute greater influence to fatigue and overwork, both local and general, than to the more directly mechanical agencies to which hemorrhages and even detachment of the retina are ascribed. He also thinks that the influence of coughing, vomiting, violent exercise, etc., has been overrated in the past, and that too little attention has been bestowed on physiological congestion and overuse. MARSHALL.

JACKSON (183) recommends a small slight hole in the ophthalmoscopic mirror for the examination of the fundus, especially in the region of the macula. He also brings out the fact that the corneal reflex will be better avoided if the instrument is held to one side, so the edge of the sight hole will come in front of the centre of the observer's pupil. ALLING.

The test described by VERHOEFF (184) consists in combining two figures with the stereoscope. One is a circle with a line passing through it bent at its centre to form an obtuse angle. The other is also a circle with two parallel lines running through it. When the two are combined by stereoscopic vision there is one circle with two lines bent with the apex of the angle toward the patient. ALLING.

VI.—REFRACTION AND ACCOMMODATION.

185. **Duane.** Some considerations on the hygienic and prophylactic treatment of myopia. *N. Y. Med. Journ.*, June 7, 1903.

186. **Brandes.** Astigmatic accommodation under the influence of the localized action of homatropine and eserine. *Inaug. Dissert.*, Leyden, 1903.

187. **Liebreich, R.** The treatment of myopia. *Ophth. Review*, February, 1903.

188. **Risley.** Changes in refraction. *Ophth. Record*, March, 1903.

DUANE (185) divides myopia into three classes: (1) myopia of less than 2. D; (2) myopia beginning in childhood and increasing up to the age of twenty-two, 2.–10. D; (3) pernicious progressive myopia, which continues to increase even in adult life. Besides the usual hygienic regulations, he regards complete correction as one of the chief safeguards against the increase of myopia.

BRANDES'S (186) investigations were concerning the question whether unequal increase of the curvature of the lens was possible. A granule of homatropine was placed at the upper sclerocorneal junction, while the patient was directed to look down.

In other cases, after the use of cocaine a little eserine substance was placed on the corneal margin at two points diametrically opposite. His conclusions were as follows:

1. The localized effect of homatropine or eserine upon the ciliary muscle gives rise to astigmatic accommodation.

2. That meridian corresponding to the point of application of the homatropine or eserine becomes in accommodation more weakly refracting in the former case and more strongly refracting in the latter.

3. Astigmatic accommodation from the localized effect of homatropine, is rarely greater than 1. D. After the use of eserine there may be astigmatic accommodation as great as 2.–2.5 D, but, as a rule, it is not greater than 1. D.

4. Astigmatic accommodation after the use of homatropine or eserine is of short duration. In a few minutes the entire ciliary muscle becomes affected. JITTA.

In this paper, LIEBREICH (187) discusses very fully his ideas on the use of prisms, and strongly advocates them in most cases of myopia, and also in hypermetropia, as in the former condition he "considers such a use of prisms as the only positive means of preventing the progress of myopia." MARSHALL.

RISLEY (188) relates five cases of hyperopia and astigmatism in which more or less marked changes in the amount of the error and in the axis of the astigmatism had taken place without pathologic findings. ALLING.

VII.—MUSCLES AND NERVES.

189. **Träblich.** Advancement in a case of strabismus inferior. *Klin. Monatsbl. f. Augenheilk.*, xli., 1, p. 409.

190. **Prins Visser.** The ultimate result of squint operations. *Inaug. Dissert.*, Amsterdam, 1903.

191. **De Lapersonne.** Traumatic paralysis of the ocular muscles. *Bull. de l'acad. de méd. de Paris*, May 26, 1903.

192. **Le Roux.** Two cases of isolated paralysis of the sixth pair following cranial injuries in infants. *Arch. d'opht.*, xxiii., 5, p. 297.

193. **Berger** and **Loewy.** On secondary contracture of the levator of the upper lid in the course of facial paralysis. *Soc. de biologie de Paris*, May 31, 1903.

194. **Dimmer.** Traumatic paralysis of the ocular muscles due to an orbital cause. *Zeitschr. f. Augenheilk.*, ix., Ergänzungsheft, p. 327.

195. **Blaschek.** Diplopia near the limits of the binocular field of vision. *Ibid.*, p. 416.

196. **Wittemberski.** Four cases of mucocele of the ethmoid with remarks on the eventual effect upon the movements of the eye. *Ibid.*, p. 464.

197. **Seggel.** Bilateral abducens paralysis and paralysis of lateroversion. *Münch. med. Wochenschr.*, 1903, No. 18, p. 772.

198. **Schilling.** On recurrent oculomotor paralysis. *Ibid.*, p. 776.

199. **Pflueger.** Clinical contributions to the knowledge of contractions of the ciliary muscles. *Klin. Monatsbl. f. Augenheilk.*, xli., 1, p. 353.

200. **Verhoeff.** A gradual plastic tenotomy. *Ibid.*, p. 393.

201. **Bielschowsky.** On pupillary phenomena. *Ibid.*, xvi., Beilageheft, p. 308.

202. **Russell, J. W.** A case of migraine associated with ophthalmoplegia. *Brit. Med. Journ.*, May 2, 1903.

203. **Sinclair, M. M.** Nystagmus as a family peculiarity. *Ibid.*, May 23, 1903.

204. **Jackson.** Operation on the tendon of the superior rectus for paresis of the superior oblique. *Ophth. Review*, March, 1903.

205. **Kipp.** Transient unilateral ophthalmoplegia of peripheral origin, with atrophy of the optic nerve. *Amer. Med.*, Apr. 25, 1903.

206. **Spiller.** The paradoxical reaction of the pupil in accommodation, with report of three cases. *Phil. Med. Journ.*, May 2, 1903.

TRÄBLICH'S (189) patient has a right inferior strabismus following paralysis of the superior rectus and causing annoying diplopia. An advancement of the right superior rectus led to primary over-correction, but in a few days the eye assumed a normal position and the diplopia ceased.

VISSER (190) sends the results of 86 operations for strabismus done in the Amsterdam university eye clinic between 1895 and 1903.

In these cases there were done:

in 13 cases, simple tenotomy;
in 41 cases, tenotomy on both eyes;
in 15 cases, one tenotomy and one advancement;
in 7 cases, tenotomy on both eyes with one advancement;
in 9 cases, tenotomy on both eyes with two advancements;
in 3 cases, two advancements.

In 79 of the 86 cases a satisfactory result was obtained. The existence or non-existence of binocular vision naturally had a great influence upon the position of the eyes. All the double tenotomies were done in exactly the same manner and yet the effect varied from 10° to 40°. This is evidence that graduation is not dependent upon the operation only but upon the conditions in that particular patient as well.

The unpleasant results were:

1. Sinking of the caruncle, which often follows tenotomy.
2. Limitation of lateral motility, which is rare.
3. Widening of the palpebral aperture, which was noticeable in but two cases; and
4. Disturbances of convergence, which long continue.

Vision mostly remains unchanged; in 9 cases it improved. In general one may say that a single tenotomy gives good results, and that advancement is not so frequently necessary as Landolt claims. JITTA.

DE LAPERSONNE (191) speaks of the occurrence of traumatic paralysis of the ocular muscles, caused by hemorrhages within the muscle sheaths and affecting only the elevators or depressors of the eyes. Recovery is complete except when neuritic changes exist. BERGER.

LE ROUX (192) observed two cases of paralysis of the abducens after injuries to the skull in children under ten years of age, at which time, according to Panas, fractures of the base, and particularly of the petrous portion of the temporal bone, are very rare. In both cases there was lateral compression of the skull. In the first case, after severe contusions of the right parietal region with brain symptoms, bleeding from the nose and right ear, there was an immediate paralysis of both external recti. The left external rectus recovered its function in three months, while the right remained permanently paralyzed. Probably a fragment of bone had injured the right abducens, while a hemorrhage from the inferior petrosal sinus had caused merely a transient paralysis of the left.

In the second case there were compression of the left parietal region and hemorrhage from the left ear, with slight brain symptoms except vomiting. A paralysis of the left external rectus was recovered from in two months. Here, although bleeding from the ear suggested fracture, there was probably only a rupture of the inferior petrosal sinus. The prognosis is doubtful in such cases. v. MITTLESTÄDT.

BERGER and LOEWY (193) observed in a case of long-continued peripheral facial paralysis the development of a secondary contracture of the levator. Notwithstanding the improvement in the symptoms due to the facial paralysis, the lagophthalmus continued and the patient by an effort could not perceptibly narrow the palpebral aperture on the affected side. When the upper lid was drawn down by the finger and held so for a time, the voluntary closure of the lids was better performed, which was explained as being due to the fact that, in consequence of the long-continued paralysis of the orbicularis, the secondary contracture of its opponent, the levator, was temporarily relaxed by the forcible closure of the lids. The secondary contracture is of clincal importance since it prolongs the lagophthalmus, and in this case led to keratitis xerotica. The contracture passes off in sleep and the palpebral aperture then appears narrower than when the lids are closed voluntarily. BERGER.

DIMMER (194) describes two cases of traumatic paralysis of the ocular muscles. In the first the region of the left eye was injured, causing paralysis of the levator and paresis of the inferior rectus. The latter was doubtless due to direct injury of the muscle tendon, but the paralysis of the levator was of a more complicated production. The piece of iron striking the lower lid forced the ball up beneath the upper lid and by pressure ruptured the belly of the levator.

In his second case a woman injured her left eye by striking it against a hook. There were a small coloboma on the mesial side of the upper lid and a symblepharon fold on the tarsal conjunctiva, besides ptosis and paralysis of the superior and internal recti. The tendon of the internal rectus was severed, but the ptosis was explained by pressure upon the upper lid by the foreign body acting from below. The superior rectus was indirectly injured by the same means. If the tendon of origin of the levator were torn from the periosteum, it is quite possible that this tear in the periorbita in the region of the origin of the superior rectus

might be extensive and thus cause a lengthening and disturbance in the muscle.

Diplopia near the limits of the binocular field, sometimes crossed, sometimes homonymous, is explained by BLASCHEK (195) as being due to latent imbalance of the ocular muscles, which can be overcome in the central portion of the field. His examinations were made in 120 persons in whom he had previously tested the refraction and the balance of the muscles.

WITTEMBERSKI (196) describes the clinical history of four cases of mucocele of the ethmoid cells, and attributes disturbance in the motility of the eye in the vertical plane to a displacement of the trochlea and stretching of the optic nerve. According to the location of the mucocele, the eye may be displaced outward, forward, or downward.

SEGGEL (197) observed a patient of sixty-two with paralysis of the right external rectus and paralysis of dextroversion, besides bilateral choked disc. Later there were paralysis of the right superior oblique, paralysis of the left external rectus and of sinistroversion, right facial paralysis, paralysis of the right hypoglossus, and atrophy of both optic nerves. Autopsy revealed a solitary tubercle in the upper portion of the pons under the floor of the fourth ventricle.

The author sees in this observation a confirmation of the idea that affections of the nucleus of the sixth cause not only paralysis of the external rectus but also defects in the function of the internal rectus of the other eye, and thus cause paralysis of associated lateroversion.

SCHILLING (198) observed in Oppenheim's clinic a boy of fifteen, who at the age of eight had a complete left oculomotor paralysis. In the following seven years there were at short intervals recurrences of less intensity. The attacks were associated with severe pain in the left forehead and temporal region and with vomiting. Between the attacks there was no migraine, nor was migraine found in other members of the family. The patient stuttered and had medullated nerve fibres in the retina. The author believed that there was a congenital weakness of the oculomotor nerve or its nucleus.

PFLUEGER (199) reports two case-histories. The first was in a child who had paralysis of accommodation after diphtheria, and after recovery a latent hyperopic astigmatism became manifest.

The second was a case of spasm of accommodation with slight œdema of the retina, in which there were myopia of 2.25 D and a myopic astigmatism against the rule of 2.25. After recovery, no astigmatism could be made out either subjectively or objectively. From this clinical observation of partial contraction of the ciliary muscle the author feels warranted in supposing that such spasms may habitually occur to overcome low degrees of astigmatism.

VERHOEFF (200) recommends in cases of slight deviation of the eye incisions in the tendon, made in such a manner that the attachment of the tendon to the sclera is narrowed.

BIELSCHOWSKY (201) describes some peculiar forms of "jumping" pupils. In a woman of twenty, with right oculomotor paralysis since early childhood, there occurred in the right eye alternating phases of mydriasis and myosis at intervals of twenty to thirty seconds. When myosis came on, the ball turned in and down and with the return of mydriasis returned to its previous position of divergence. With the myosis there was contraction of the ciliary muscle revealed by the altered refraction. The left pupil reacted normally and took no part in the cyclic changes in the other. The phenomenon on the right side occurred only when the gaze was directed straight forward. In looking to the left, the right eye scarcely turned and the right pupil remained contracted; in looking to the right, it remained constantly dilated. The impulses to lateroversion were the only factors, apart from light, accommodation, etc., which caused an alteration in the pupil. The author cites four other cases reported in which synchronously with the dilatation and contraction of the pupils there was elevation or lowering of the paralyzed upper lid, and he concludes that the cyclic symptoms depend upon a constant excitation in the nucleus of the incompletely paralyzed nerve from the residuum of a previous lesion.

He reports, also, two cases of periodic unilateral myosis. In both cases there was reflex iridoplegia and paralysis of the right oculomotor. Only in binocular fixation was the left pupil narrower than the right. But on account of the reduced function of the right internal rectus binocular fixation required an abnormally strong convergence innervation. There was associated with it a marked contraction of the pupils, which was naturally more excessive on the side of the normally innervated sphincter.

The patient described by RUSSELL (202) is a boy aged thirteen, who since birth had suffered from oft-repeated attacks of sickness,

and these have been associated with severe headaches. He usually has an attack every two weeks, and the intervals have never exceeded a month.

For the last six years the attacks have been complicated by drooping of the left eyelid and strabismus, which at first were temporary, but during the last two years have been persistent.

On the left side there are slight ptosis, marked external strabismus, and extreme dilatation of the pupil, which is inactive to light and accommodation. The optic discs are normal, and there is no paresis of face, tongue, or limbs. No treatment has effected any permanent relief. Some previously published cases are mentioned. MARSHALL.

SINCLAIR (203) gives the following particulars of the family:

Child, A, aged twenty-one months, has had marked horizontal nystagmus since birth; a brother, B, aged nineteen, had the defect well marked in infancy, and it still appears occasionally if he gets excited. The mother's sister, C, has had nystagmus all her life, and of her seven children three present a like peculiarity: a daughter, D, aged twenty-three, in whom it is very well marked; a son, E, aged twenty-five; and another son, F, aged twelve. The peculiarity could not be traced on the father's side.

MARSHALL.

The action of these two muscles is discussed by JACKSON (204), and the conclusion arrived at is that it is possible, by altering the attachment of the superior rectus and displacing the insertion backwards and outwards, to overcome the pain and discomfort of paresis of the superior oblique. The operation is described and illustrative cases given. MARSHALL.

The case reported by KIPP (205) was that of woman æt. thirty-five. The history shows a number of abortions and an attack of facial paralysis. The right eye had p. l. with normal fundus, and later developed ophthalmoplegia externa. She recovered from the paralysis under potassium iodide, but the eye became absolutely blind. It would seem most probable that the process was a periostitis, circumscribed meningitis, or gumma at the base of the middle fossa, just back of the orbit.

The escape of the ciliary and sphincter fibres may be explained by the fact that they have been thought to lie in the centre of the nerve trunk as it enters the dura. The case shows that ophthalmoplegia is not necessarily nuclear in origin. ALLING.

The anomalous condition in which the pupil dilates when light is thrown into the eye is occasionally observed. SPILLER (206) relates three cases of a similar phenomenon where the pupil dilated with the act of accommodation. He was able to find but one other record of this sort. ALLING.

Sections VIII.–XII. Reviewed by DR. R. SCHWEIGGER, Berlin.

VIII.—LIDS.

207. **Neese.** Œdema of the lids in tertiary syphilis. *Klin. Monatsbl. f. Augenheilk.*, xli., 1, p. 462.

208. **Caspar.** Herpes zoster ophthalmicus and paralysis of the superior oblique. *Arch. f. Augenheilk.*, xlviii., p. 177.

209. **Villard.** Histological researches on xanthelasma of the lids. *Arch. d'opht.*, xxiii., 6, p. 364; *Rec. d'opht.*, xxv., p. 330.

210. **Dutoit.** A case of pseudo-leukæmic lymphoma of the lids with generalized lymphoma. *Arch. f. Augenheilk.*, xlviii., 2, p. 156.

211. **Hotz.** Three essential points in the operation for cicatricial ectropion. *Journ. Amer. Med. Assoc.*, May 2, 1903.

212. **Allport.** A modification of Panas's operation for ptosis. *Ibid.*, Apr. 11, 1903.

In NEESE'S (207) patient a gummatous nodule developed in the œdematous eyelid while the other upper lid became œdematous. The lachrymal gland was forced forward, but there was otherwise nothing abnormal about the orbits. The author believed that there were gummata in the orbit. Under mercurial treatment the œdema of the lids passed off.

Two weeks after an attack of herpes zoster frontalis with fever, CASPAR'S (208) patient developed a paralysis of the superior oblique upon the same side, and three weeks later a facial paralysis on the other side. The author believes that there was an infectious neuritis or perineuritis beginning in the first branch of the fifth and the Gasserian ganglion and spreading elsewhere.

VILLARD (209) has studied xanthelasma cells by the new technical methods. The large, round, mononuclear cells are found in groups among the connective-tissue tracts of the deeper cutis. They have no cell membrane, but contain in the interior a network in which are contained small globules of an albuminoid character and also some pigment in fine granules. These pigmented cells appear to be transition forms arising from pigmented connective-tissue cells, and when the pigment is lost becoming xanthelasma cells. A further transformation occurs

when several cells unite and their contents combine to make up large polynuclear coagulation masses of a homogeneous substance taking stains. v. MITTELSTÄDT.

DUTOIT (210) in his dissertation continues the history up to the autopsy of a patient who had had tumors on all four lids, and in the course of seven years developed more and more symptoms of pseudo-leukæmia. The tumors of the lids were removed but returned. The conjunctiva was involved. There was never exophthalmus, and the spleen was not enlarged until the last year.

HOTZ (211) emphasized three points in the operation for ectropion: 1. Proper division and fixation of the skin flaps. He recommends that two flaps be used, one covering the defect in the lid and attached to the upper and lower edge of the tarsus, the other to cover the remaining defect. The shrinking of the latter flap will not affect the lid border. 2. Selection of the most suitable material for covering the lids. He advocates either the use of the cicatricial skin usually found in the vicinity of extensive ectropion or a Thiersch graft. 3. Shortening of the elongated border of the lower lid. ALLING.

The modification of the well-known operation of Panas suggested by ALLPORT (212) consists in denuding the tongue flap of dermal epithelium in order to secure immediate union to the bridge of skin under which it is drawn. He also cuts off the corners of the two pieces of skin which are generally left pouched. ALLING.

IX.—LACHRYMAL APPARATUS.

213. **Coppez.** Five cases of tumor or pseudo-tumor of the lachrymal gland. *Arch. d'opht.*, xxiii., 6, p. 348.

214. **Pes.** A case of primary sarcoma of the lachrymal gland. *Arch. f. Augenheilk.*, xlvii., p. 186.

215. **Stock.** Local anæsthesia for external eye operations, particularly extirpation of the lachrymal sac. *Klin. Monatsbl. f. Augenheilk.*, xli., 1, p. 514.

216. **De Lapersonne** and **Rochon-Duvigneaud.** Surgical treatment of affections of the lachrymal passages. *Arch. d'opht.*, xxiii., 5, p. 262.

217. **Brady.** Mucocele of the left inferior lachrymal canaliculus. *Ophth. Record*, April, 1903.

H. COPPEZ (213) removed by Kronlein's operation two tumors of the lachrymal gland and by the old operation one tumor, all

being small-celled sarcomas, and the two patients being respectively sixty-one and forty-one. All the tumors were encapsulated and independent of the lachrymal glands, which were displaced and more or less atrophic.

In a fourth case, in a man of sixty-five, he found a fibrous tumor with partial atrophy of the lobules of the glands after a glandular inflammation.

Coppez saw also a luxation of the lachrymal gland in a girl of twenty-one who had fallen, striking the left brow. A tumor as large as a hazel-nut appeared under the upper lid. The eye remained dry even when the patient wept. The structure of the gland was little changed. V. MITTELSTÄDT.

In an infant aged seven months PES (214) observed a protrusion of the left eye which was more marked when the infant cried. The upper lid was regularly swollen, the ball displaced downward and forward, and its mobility limited. The tumor was fibrous and very easily movable over the upper margin of the orbit. It grew rapidly and the lid underwent a bluish-red discoloration. A diagnosis of erectile tumor of the orbit, probably angioma, was made. When removed, the tumor was found to be in connection with the orbital lachrymal gland, and microscopically Pes regarded it as an angio-sarcoma. The absence of cachexia, metastases, or recurrence indicated that the tumor was benign.

STOCK (215) recommends for local anæsthesia injections of 1 % cocaine with three drops of 1:1000 adrenalin to each *cc.* The field of operation becomes waxy white, deeply and lastingly anæsthetic, anæmic, and but slightly œdematous. Some days after the operation an œdema appears and lasts two or three days. On account of the danger of secondary hemorrhage a compress bandage is recommended.

In a report intended for the Madrid Congress DE LAPERSONNE and ROCHON-DUVIGNEAUD (216) lay down general rules for the treatment of diseases of the lachrymal apparatus.

1. In cases of simple lachrymation, if after removal of the causes outside of the tear pâssages there is no improvement, small Bowman's sounds should be used and antiseptic and astringent injections. The punctum is to be split only as much as is necessary to allow the introduction of the sound. In old cases, electrolysis may be employed.

2. In chronic blennorrhœa without ectasia: Stilling's opera-

tion with extensive splitting of the canaliculus where it enters the sac. Treatment with sounds and injections, and also electrolysis to widen strictures.

3. When the conditions are the same but with dilatation of the sac and recurrent acute inflammations: extirpation of the sac or curetting and thermocauterization.

4. In cases of fistula, marked changes in the mucosa of the sac, tuberculosis, involvement of the periosteum or bone: destruction of the sac with the thermocautery.

5. In cases of acute phlegmon of the sac and surrounding tissues: extensive incision through the skin.

6. In case these methods of treatment are of no avail the removal of the palpebral lachrymal gland is indicated.

v. MITTELSTÄDT.

In BRADY'S (217) case there was a translucent cyst at the inner margin of the lower lid. The canaliculus was closed at each end. ALLING.

X.—ORBIT AND NEIGHBORING CAVITIES.

218. **Valude.** The ophthalmic surgery of the frontal sinus. *Ann. d'ocul.*, cxxix., p. 337.

219. **Knapp, A.** Chronic empyema of the ethmoidal and frontal sinuses, with exophthalmus; operation. These ARCHIVES, xxxii., 3, p. 214.

220. **Wittemberski.** Four cases of mucocele of the ethmoid cells, with remarks on the possible effect upon the movements of the eyes. *Zeitschr. f. Augenheilk.*, ix., Ergänzungsheft, p. 463.

221. **Maxwell, P. M.** An operation to enlarge a contracted socket so that it may hold a glass eye. *Ophth. Review*, May, 1903.

222. **Würdemann.** Cure of pulsating exophthalmos by ligature of the common carotid artery. *Annals of Ophth.*, April, 1903.

223. **Chance.** Orbital cellulitis as a sequel of scarlatina. The report of two cases. *Amer. Med.*, June 13, 1903.

VALUDE (218) believes that in the cases of inflammation of the frontal sinus which lead the patient to visit the ophthalmologist the radical operation may not be necessary. He recommends opening the sinus, following a fistula, if one exists, with or without curetting the wall of the sinus. The important thing is to evacuate the contents of the sinus. Fronto-nasal drainage seems to the author an unnecessary complication. Three case-histories are offered in support of his views. BERGER.

WITTEMBERSKI (220) describes four cases of mucous cysts of the ethmoid cells. The location of the cyst does not correspond

always to the lamina papyracea; it sometimes extends more behind the lachrymal sac, sometimes into the orbit, and sometimes beneath the bridge of the nose. The covering bone is finally destroyed and the mass fluctuates. The author discusses in detail the displacement of the ball by the ethmoid cyst in the direction of the muscle funnel, and the effect of the displacement of muscles and optic nerve upon the movements of the eye, as evidenced by the double images. In this respect scarcely one case resembles another.

A further modification of the operation for contracted socket described by MAXWELL (221) in volume 12 of the *Ophthalmic Review* is here given. It consists of enlarging the floor of the conjunctival sac by means of inserting a skin flap which is cut from the lower lid through an incision in the floor of the orbit. The flap not being completely separated from its deep attachment ought to remain alive, and gratifying results have followed this procedure in the author's hands. MARSHALL.

XI.—CONJUNCTIVA.

224. **Poulard.** Streptococcus infections of the conjunctiva. *Arch. d'opht.*, xxiii., 6, p. 382.

225. **Bietti.** Of what importance are diphtheria and allied bacilli in the etiology of simple conjunctivitis? *Klin. Monatsbl. f. Augenheilk.*, Beilageheft, xli., p. 87.

226. **Dahlström.** Inflammations of the joints in blennorrhœa of the newborn. *Ibid.*, p. 381.

227. **Neuburger.** Polyarthritis with blennorrhœa neonatorum. *Ibid.*, xli., 1, p. 406.

228. **Apetz.** Metastatic gonorrhœal inflammation in the eyes of adults. *Münch. med. Wochenschr.*, 1903, No. 31, p. 1340.

229. **Rosner.** A contribution to the subject of blennorrhœa neonatorum. *Med. Blätter*, 1903, Nos. 16, 17.

230. **Morax.** On the etiology of ophthalmia neonatorum. *Ann. d'ocul.*, cxxix., p. 346.

231. **Speciale-Cirincione.** Late hereditary syphilitic gumma of the conjunctiva. *Rev. génér. d'opht.*, xxii., p. 145.

232. **Ballaban.** Molluscum contagiosum of the ocular conjunctiva. *Arch f. Augenheilk.*, xlvii., p. 180.

233. **Dimmer.** A case of hyaline degeneration of the lids and conjunctiva with extensive calcification and ossification. *Zeitschr. f. Augenheilk.*, ix., Ergänzungsheft, p. 474.

234. **Oppenheimer.** Nævus pigmentosus of the conjunctiva and cornea. *Deutsche med. Wochenschr.*, 1903, No. 8, p. 143.

235. **Berry.** Primary acute miliary tuberculosis of the conjunctiva. *Edinburgh Medical Journal*, May, 1903.

236. **Ellett.** A new method of preventing infection from the conjunctiva after operation involving opening the anterior chamber. *Ophth. Record*, April, 1903.

POULARD'S (224) four cases of severe conjunctivitis occurred in one adult and three children. In two cases the cornea was perforated and in one panophthalmitis developed. The secretion in all cases contained, besides other micro-organisms, constantly streptococci. In all the cases there was enlargement of the preauricular glands and in some cases of the submaxillary glands also. Besides muco-purulent secretions there were present at times slight pseudo-membranes lasting but a short time. According to the author, there was not a primary streptococcus infection but the streptococci came upon an already inflamed conjunctiva and rendered a simple inflammation more severe. General diseases, such as measles, scarlatina, diphtheria, and whooping-cough, predispose to these secondary streptococcus infections. The author divides streptococcus conjunctivitis into (1) the form described by Parinaud, caused by disease of the lachrymal passages; (2) the form following general diseases; and (3) the form in which there is secondary infection of a conjunctiva already inflamed. v. MITTELSTÄDT.

BIETTI'S (225) animal experiments with diphtheria and similar bacilli, obtained from the secretion of conjunctival catarrh, showed that the bacilli resembling the diphtheria bacillus were not pathogenic on the conjunctiva of animals. Inoculation on the human conjunctiva was done nine times without producing the slightest reaction. Diphtheria antitoxin had no influence upon these bacilli. Genuine toxic diphtheria bacilli are rarely found in the secretion of simple conjunctivitis. In one hundred cases of simple catarrh examined, no proof was found that the non-virulent so-called xerosis bacilli were the cause of the disease.

DAHLSTRÖM (226) furnishes a tabulated report of fifteen cases of affection of the joints with ophthalmia neonatorum. He suggests the possibility, mentioned by others, that gonococci may pass into the subepithelial tissue, thence into the lymph and blood currents, and thus to the joints. Nothing can be said definitely in regard to the relation of age and severity of the blennorrhœa to the metastatic inflammations. It is noteworthy that the right arm is very frequently affected.

In NEUBURGER's (227) case the affection of the joint appeared on the twelfth day. The conjunctival inflammation diminished at the same time, partly, in the author's opinion, owing to treatment, and partly, probably, from the passage of the gonococci into the blood. The mother developed an inflammation of the joints two days before the delivery.

APETZ (228) reports a case of gonorrhœa developing after being latent for several years, and being complicated with affections of the joints, conjunctivitis, ulcerous keratitis, iritis, and opacities of the vitreous. Apetz believed that gonococcus toxin caused the metastatic inflammation.

According to MORAX's (230) investigations, only half of the cases of purulent conjunctivitis in the new-born are due to the gonococcus, while in the others no micro-organism is found usually. Rarely the inflammation is caused by the Weeks bacillus, the diplo-bacillus, the pneumococcus, and perhaps also the streptococcus. BERGER.

By SPECIALE-CIRINCIONE (231) is described a remarkable case of gumma of the tarsal conjunctiva of the upper lid in a boy of fifteen, with hereditary syphilis, seen in Professor Cirincione's clinic. The gummous nodules were extirpated and the defect in the conjunctiva filled with a flap from the prepuce. In literature there are but two cases of gumma of the adnexa of the eye in late hereditary syphilis, both reported by de Lapersonne. In one there was a gumma of the upper lid and in the other a gumma near the lachrymal sac. BERGER.

BALLABAN (232), in a man of twenty, found a tumor *2cm* broad and *1cm* thick upon the eyeball, adherent to the conjunctiva and the external rectus, yellow-red in color, lobular, and fairly elastic. It proved to be a molluscum, which had no opening into the conjunctival sac and caused no irritation, but grew rapidly. No growth was to be found upon the patient's skin.

DIMMER (233) explained his peculiar case as one of old trachoma, with marked changes in the conjunctiva and other palpebral structures, in which there had probably been degeneration of the vessels. Then an acute inflammation came on, the products of which in part became necrotic, the process being favored by the vascular changes and the cicatricial degeneration of the tissues. In these necrotic tissues and the exudations hyaline degeneration took place and later ossification.

The nævus described by OPPENHEIMER (234) had existed from childhood in a man of seventy-five. It was located half on the conjunctiva, half on the cornea of the left eye as a smooth lobulated tumor, involving $\frac{3}{4}$ of the circumference of the cornea. The color was deep black. The nævus was elevated only *1mm.* Some vessels ran to it on the temporal side. Farther temporally in the conjunctiva were two lighter, brown melanomas, to which also small vessels ran.

The frequency of tuberculous disease of the conjunctiva has been variously estimated from 1:30,000 to 1:4,000 of eye hospital cases. This difference is probably due to the symptoms not being very definite, but anyhow it is a decidedly rare disease.

BERRY'S (235) Case 1 is that of a girl, aged ten, who had swelling and redness of the lids for three weeks. It started by a burn from the head of a match. The preauricular gland suppurated and was excised. There was slight inflammation of the conjunctiva of both lids and a number of grayish patches. The patient was otherwise healthy. The whole of the tumefied conjunctiva was removed, and the submaxillary glands were dissected out as they suppurated. There was also a subcutaneous swelling of the facial lymphatics, which were opened and scraped and the whole thing healed. Microscopical examination and inoculation experiments showed it to be tuberculous.

MARSHALL.

ELLETT (236) was unable to check discharge from the conjunctiva, and used the conjunctival flap to prevent infection after extraction as follows: The conjunctiva was cut all about the periphery of the cornea, and after the extraction it was drawn together by a suture so as completely to cover the cornea. The stitches were removed on the fourth day and the conjunctiva retracted. The healing of the corneal incision was normal.

ALLING.

(*To be continued.*)

NOTICES.

Tenth International Congress of Ophthalmology at Lucerne, September 13, 14, 15, 16, and 17, 1904.—*Dear Sir and Colleague:* We desire to repeat our invitation to you to take part in the International Congress of Ophthalmology at Lucerne, and to remind you of the most important points in its organization.

In compliance with the request of numerous foreign colleagues, we have advanced the date of the Congress by a few days. The official reception of members will now take place in the evening of September 13th; the mornings and afternoons of the 14th, 15th, and 16th will be devoted to scientific work, and on the 17th an excursion will bring the Congress to a close.

You will have learned from our last circular-letter that only those papers will have the right to be discussed which shall have been printed and sent beforehand to all the members of the Congress. We must therefore beg you to send any manuscripts before the 1st of May (latest date) to Prof. Mellinger, Bâle.

This first part of the Proceedings of the Congress containing these papers will be sent to the members at the same time as their tickets in receipt for the *subscription* (25 francs).

We would especially commend to your attention *the Exhibition* which will be attached to the Congress. Any object of interest to oculists, either practical or even historical (instruments, books, illustrations, appliances, etc.), will be gladly received, and should be announced before July 1st to Prof. Siegrist, Berne.

Those colleagues wishing to secure accommodation at Lucerne beforehand are advised to apply before the first of September to Dr. F. Stocker, president of the local committee at Lucerne. He will engage for them a room at one of the best hotels (early breakfast included), at 5 francs a day each person.

The town of Lucerne is treating us most liberally, throwing

open all objects of interest and arranging fêtes of all descriptions.

At the same time the mountain railway companies and steamboats have promised a considerable reduction in their fares.

Since sending out our last circular we have to lament the loss by death of our collaborator, Professor Pflüger. We have appointed in his place his successor at the University of Berne, Prof. Siegrist, and we have elected as Vice-President of the Congress, Dr. E. Landolt of Paris.

We owe our sincere thanks to those colleagues who have offered their assistance, and feel sure that occasions will offer for us to avail ourselves of their kindness. For the present, however, we have, for greater simplification, reduced the number of correspondents to a minimum.

Accept, dear Sir, the assurance of our highest esteem.

Professor SNELLEN, Utrecht,
President of the Ninth Congress;
Dr. BARDE, Geneva;
Prof. M. DUFOUR, Lausanne;
Professor HAAB, Zurich;
Dr. E. LANDOLT, Paris;
Professor MELLINGER, Bâle;
Professor SIEGRIST, Berne.

Any colleagues desiring fuller information can obtain it from

WALTER H. JESSOP, M.B., 73 Harley Street, London;
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Dr. COOTE, Quebec, Canada;
Dr. ALFRED OSBORNE, Alexandria, Egypt;

correspondents for the United Kingdom and for the United States.